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AIR SERVICE JOURNAL
The National Aeronautic Newspaper
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SMITHSONIAN INSTITUTION
NATIONAL AIR MUSEUM

Congressional Aero Committees Should Be Appointed Immediately

Military and Naval Problems Need Solution

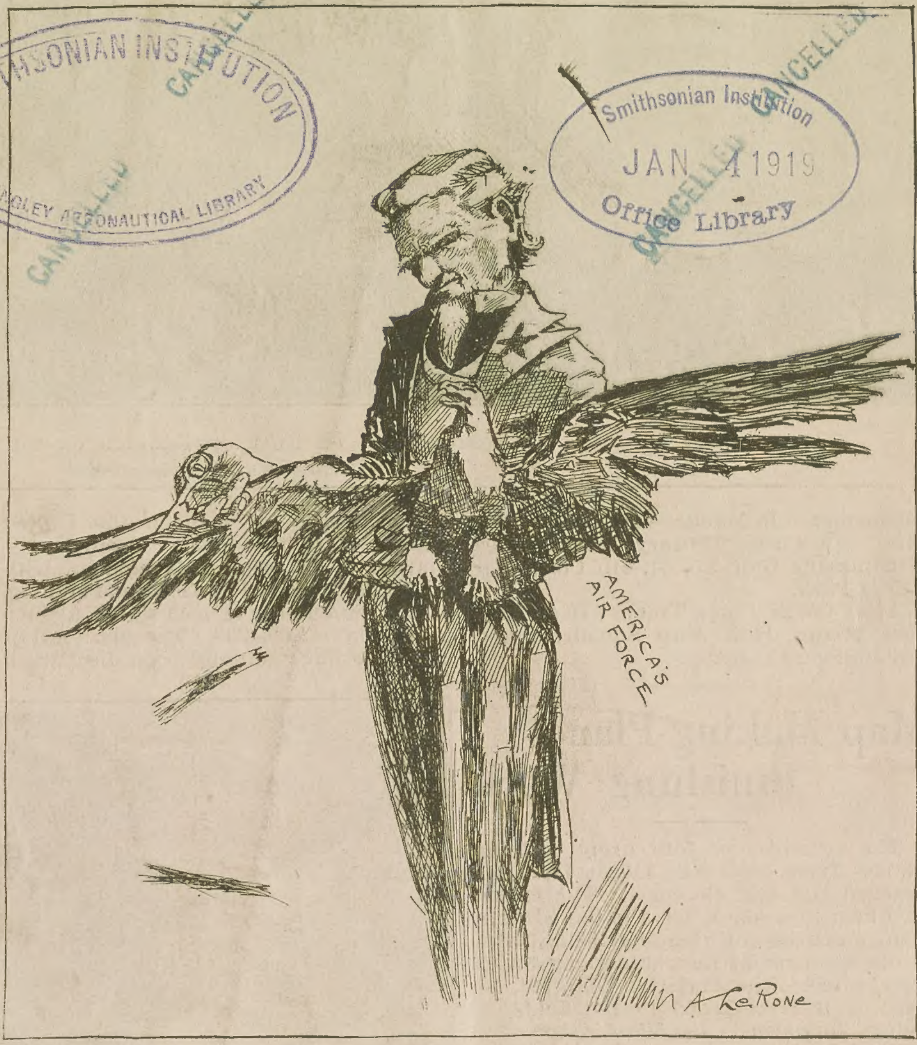
ACTION IS VITAL

200,000 Air Service Troops Entitled to Recognition

Commercial and Legal Status Uncertain

FOREIGN PROGRESS

British Plans for Control of Aeronautics in Peace Time



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HAVE WE COME TO THIS?

So general has been the favorable comment on the suggestion of the appointment of Congressional committees on aeronautics that it is believed that within a very short time these necessary bodies will come into being and the whole tangled maze of aviation in this country will begin to be unraveled. Some of the Senators and Representatives who have been interested in aeronautics have indicated that they believed that such committees would help solve some of the many problems that will come up in the near future, and if Congress can be informed of the importance of immediate action on this vital question, there is no doubt that the future of aeronautics in the United States will take on a more definite complexion.

Air Service Should Be Powerful Factor

In times of peace the Army and Navy are dependent on Congress for their existence but the conditions of the past are now suddenly changed and it is now the duty of the leaders of both parties to give this vital matter the most serious consideration and not lose years of progress by neglecting to maintain forces of such importance that this country will be a powerful factor in the League of Nations from the start if such a plan is carried through at the Peace Conference. The short session now under way will have all that it can do to pass the appropriation bills before it adjourns, but in those measures are embodied the foundations of the future policy of this country with regard to the military and naval strength of its armed forces.

Menoher's Appointment Reactionary

The appointment of General Menoher is the first indication of a reactionary move in the Air Service. If this branch of the Army is to go along as a small division of the War Department and its chief appointed from the successful officers of other branches of the service, it is time for all who believe in the great future of this arm to protest as vigorously as possible against this valuable force being subordinated as it will be under such direction, or being used as a plum for the holding of temporary rank gained during the war. It is obviously too early to pass on the fitness of the new chief for the work before him and his great administrative ability may overcome the likely lack of experience with the problems of air combat, but the sooner the Air Service becomes a self-contained unit with promotion for demonstrated ability in its own personnel, the better pleased wil be the whole great body of officers and men who have helped to make this service respected at home and abroad.

Flying Licenses Should Be Granted

Those who look to the military and naval authorities alone for guidance will not get far if the programs submitted are cut out of the larger requirements of the army and the navy. Congress must see that soon it will have the legal commercial and technical sides of aviation to consider and with these matters will come problems of the most intricate nature. At the present time all flying in this country is paralyzed by the failure of the joint Army and Navy Board of Aeronautic Cognizance to grant licenses to fliers for any but government work. The holding up of such permits can only tend to further disrupt an industrial situation of the most promising sort.

Foreign Programs Are Prepared

Abroad, with great foresight, the authorities have been studying the various aspects of the future of aeronautics for a long time. The best minds in England have been at work on the subject for many months, and have progressed so far as to have ready a preliminary report which has in it much that will have to be given the most serious consideration by this Government if the airplane is to take its place in the world of commerce without impossible barriers being erected to its progress. The legal situation will require the most careful study to make sure that the control of the air is not to be assumed by the individual states, a calamity which would bring in its train all sorts of petty legislation.

Committees on Aeronautics Imperative

All these facts emphasize the importance of having Congressional leaders who will possess a continuing acquaintance with the many problems that will arise and insure that the future course of bodies of inquiry shall not be cluttered with a mass of material which should have been forgotten knowledge of intelligent and informed observers. The only way that this can be accomplished will be to have the committees suggested by the AIR SERVICE JOURNAL made standing committees and the membership of such committees composed of men who have been in touch with aeronautic affairs during the last few years. To them can be referred all matters requiring specialized knowledge of aviation, and the country would feel that such matters were receiving the best thought that could be given.

International Conference on Aeronautics

To give an intimation of some of the problems that will come up, this issue of the AIR SERVICE JOURNAL prints an outline of the preliminary report of the English Board, published by the London *Times*, with the hope that it may be considered of such importance that similar work will be begun in this country at once. An international conference is probably to be called on the subject of international aeronautics, and this country, which has so many problems to consider, can be best represented at such a meeting by men who have been giving the whole subject careful and disinterested study.

Civil Aerial Transport Committee

"The original reference to the Civil Aerial Transport Committee was to consider:

"(1) The steps which should be taken with a view to the development and regulation after the war of aviation for civil and commercial purposes, from a domestic, an Imperial and an international standpoint.

"(2) The extent to which it will be possible to utilize for the above purpose the trained personnel of the aircraft which the conclusion of peace may leave surplus to the requirements of the Naval and Military Air Services of the United Kingdom and Overseas Dominions.

"The Committee, which has undergone some changes since its appointment in

(Continued on page 6)

"THE FUTURE OF AERONAUTICS IN AMERICA"

Keynote of the Dinner to Be Given Next Tuesday Evening

OVER 600 PERSONS INVITED

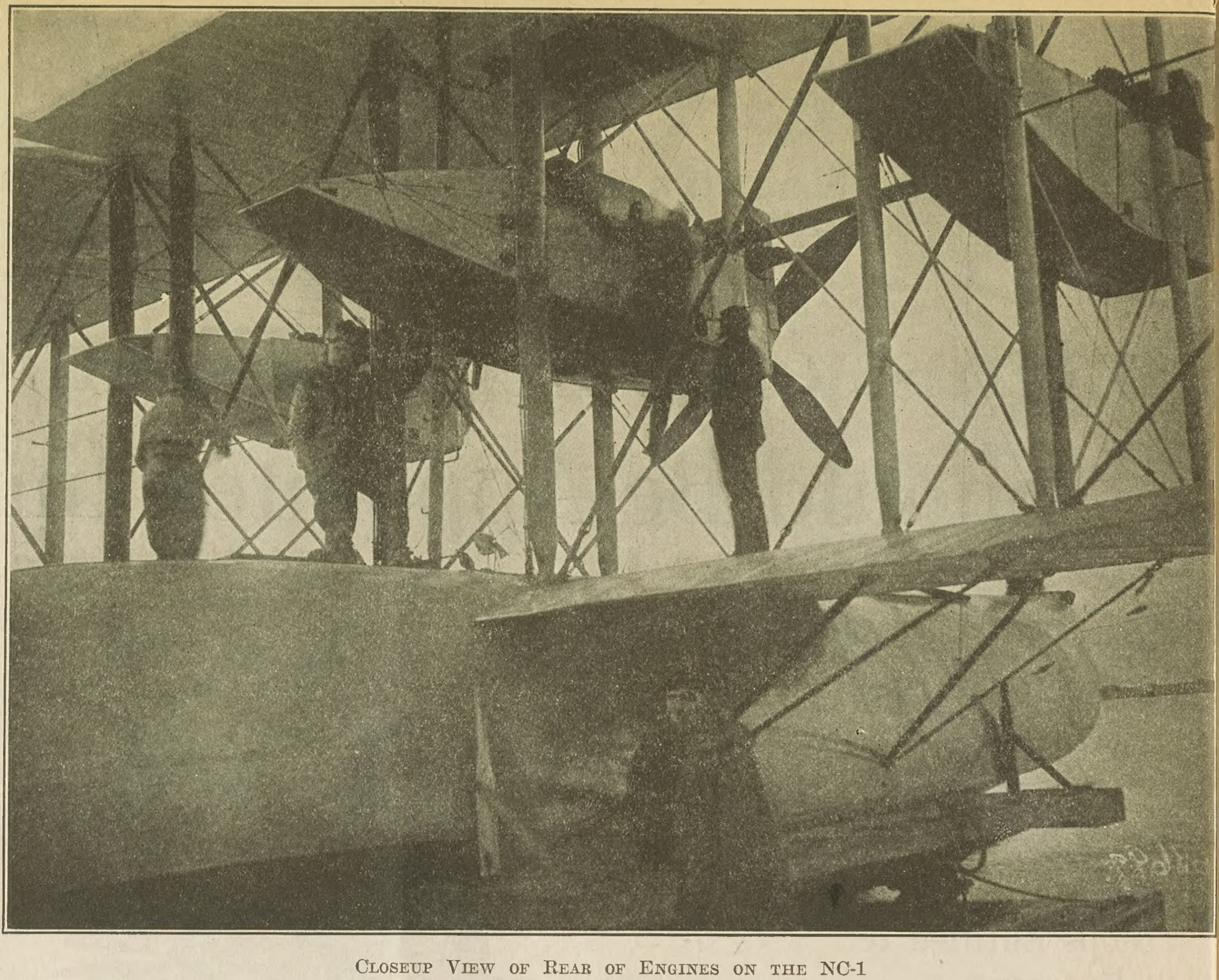
Preparations for the International Aeronautical Exposition at Madison Square Garden Feb. 27 to March 6

Invitations are being sent by the Manufacturers' Aircraft Association to some 600 persons to attend an aeronautical dinner at the Waldorf-Astoria, Tuesday evening, Jan. 7. Arrangements are in the hands of J. G. White, president of the Springfield Aircraft Corporation; H. B. Mingle, president of the Standard Aircraft Corporation, and R. F. Hoyt, of the Wright-Martin Aircraft Corporation.

The dinner will be the means of expressing the nation's achievements and ambitions in aerial navigation. The topic which will be touched upon by all speakers and dealt extensively with by some will be: "The Future of Aeronautics in America." The dinner committee explains that the occasion, while offering opportunity to review the scientific and industrial work done for the nation during the war, calls more for the expression of a definite policy covering the use and disposal of material left over from the conflict and the development of new types.

The Manufacturers' Aircraft Association also is making extensive preparations for the International Aeronautical Exposition, which is to be held in Madison Square Garden, Feb. 27 to March 6, inclusive. Arrangements are in charge of Ingliss M. Uppercu, president of the Aeromarine Plane & Motor Corporation; Albert H. Flint, president of the L-W-F Engineering Corporation, and F. L. Faurote, of the Curtiss Engineering Corporation.

It is yet too early to make any definite announcement with regard to the exhibitors, but it is certain that the exposition will afford the first opportunity for people to study the airplane at first hand and to observe how the science of mechanical flight has advanced during the war. The exposition will be educational and historic in character, as well as commercial.



Closeup View of Rear of Engines on the NC-1
(C) *Western Newspaper Union*

A. S. Units on the German Frontier

General March has announced the following named units as among those which composed the Third Army, or the Army of Occupation along the German frontier:

Army Troops, Headquarters Troops: Third Army Air Service Headquarters, First Pursuit Group, Pursuit Group, Pursuit Squadron No. 4, 4th Air Park, Headquarters Bombardment Group. Day Bombing Squadron 166, Headquarters Army Observation Groups: Aero Squadrons 9 and 91 and Photo Sections 2 and 10.

Third Army Corps, Corps Troops: Headquarters 3rd Army Corps Air Service, First Aero Squadron, 6th Photo Section, 3rd Corps Balloon Groups Reconnaissance, First Balloon Company Branch Intelligence Office, Third Corps Sanitary Train, Field Hospitals 162, 163 and 332, Ambulance Companies 162, 163 and 332, Sales Commissary Unit No. 33.

Fourth Army Corps, Corps Troops: Fourth Corps Air Service Headquarters, 12th Aero Squadron, Photo Section No. 4, Branch Intelligence Office, Balloon Group Headquarters, 4th Corps, 2nd Balloon Co., 413th Motor Supply Train, Mobile Ordnance Repair Shop, Machine Shop Truck Unit 369, 4th Corps Sanitary Train, Ambulance Companies 301, 302, 303, Field Hospitals 301, 302, 303. Troop M, 306th Field Remount Squadron, Detachments 5th Mobile Veterinary Hospital, 4th Corps Military Police, Sales Commissary Unit No. 31, 4th Corps Artillery Park.

Army Corps, Corps Troops: Headquarters Troops, 88th Aero Squadron, and 3rd Balloon Company.

Map Making Planes Finishing Work

The squadron of four army training planes flying from San Diego, Cal., has reached the Atlantic coast. The crews, two men to a plane, have gathered data and statistics on landing fields, also made air maps of the route along which they came. The material collected, as fast as it is returned to the fields, is being forwarded to Washington for analysis and compiling in the form of a government air guide or blue book.

Major Albert D. Smith, commanding the squadron, reported on Dec. 23 to the Division of Military Aeronautics that his planes left Americus, Ga., at 9 a. m., Dec. 22, and arrived at Jacksonville, Fla., at noon, having encountered rain and fog all the way and at no time having a ceiling of more than 500 feet. Major Smith started with his squadron for Washington on Dec. 26, various stops to be made en route.

Progress of Army Demobilization

The following named troops were announced on Dec. 28 as having been assigned for early convoy:

492d Aero Squadron, 2 officers, 147 men; 400th Aero Squadron, 7 officers, 155 men; 34th Balloon Co., 11 officers, 170 men; 155th, 147th, 27th and 95th Aero Squadrons, 24 officers, 725 men, and 13th, 49th and 139th Aero Squadrons, 18 officers, 545 men.

The number of men in the United States who have been ordered discharged is 937,000. This number, with the 168,239 selected by General Pershing, brings the number of men slated for discharge up to 1,005,239. The sum total of men who have actually been discharged in the United States up to Dec. 28 is 533,334. The number of officers who have been discharged up to Dec. 27 is 35,409. Orders have been issued for the discharge of 16,000 men from the D. M. A. and 3500 from the Department of Aircraft Production.

Naval Constructor Holden Chester Richardson, U. S. N.
(C) *Western Newspaper Union*

The great success of the NC-1, which has made so frequent important flights, is largely due to Commander Richardson's skill as a pilot and designer. He is one of the first aeronautical engineers in this country having been engaged in the design and construction of seaplanes for the Navy for five or six years.

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H. A. H. BAKER'S FATAL CRASH IN FRANCE

Famous Princetonian Had Papers Transferring Him Home

WIDELY ADMIRED ATHLETE

An Expert Flier and One of the Most Daring Men in the U. S. Air Service—Decorated and Promoted

Capt. Hobart A. H. Baker of the United States Air Service, the irrepressible "Hobey" of Princeton football and hockey fame, accidentally was killed in the fall of his plane at Toul, France, last Saturday. News of his death was received in New York Dec. 26 by his friend Percy Pyne, in a cablegram from Capt. Francis N. Inglehart, a member of Baker's air squadron, the Fourth Pursuit Group.

It was the unkind cut of fate that Baker should go unscathed through many desperate air duels during the war only to meet his death after the cessation of hostilities and in the last flight he was to have made before leaving for home. Papers ordering the airman to return to America at once were found in his pocket when his body was picked up.

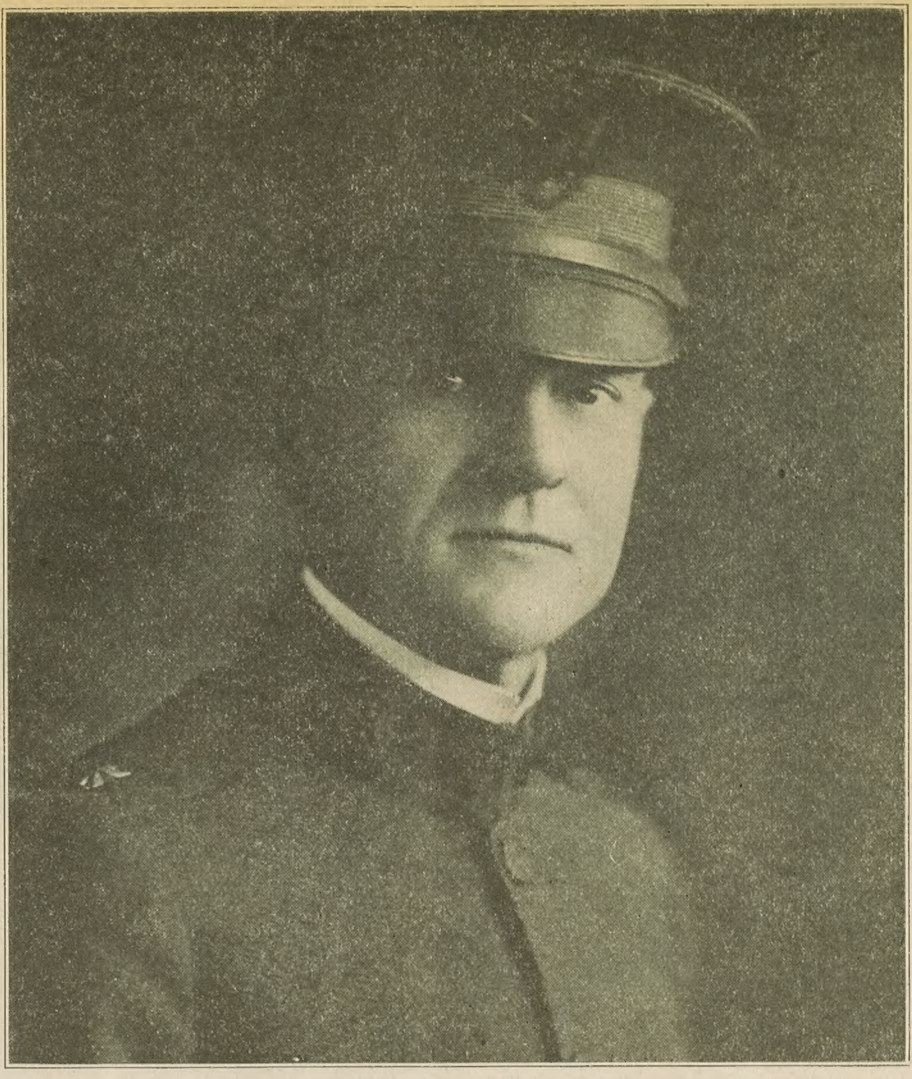
Baker will be buried in France beside two other famous American aviators who gave their lives for their country—Lufbery and Putnam.

Baker and Edwin M. Post, Jr., of this city were the first two United States aviators to be brevetted from the highest schools of France. They were inseparable friends from boyhood. They roomed together at St. Paul School at Concord, N. H., and at Princeton. Together they became graduate "pilots de chasse" from Avord, Pau and Cazau.

Baker was assigned to an army corps at the front, while Post was made officer in charge of aerial gunnery and ground training at one of the biggest flying fields in France.

Promoted to a Captain

Shortly afterward Baker was promoted to a captaincy and put in charge of a unit. Though frequently spending weeks back of the lines as an officer instructor Baker at the time the armistice was declared was said to have brought down a dozen Boche planes, though officially credited with only three. He was awarded the French Croix de Guerre and the American Distinguished Service Medal.



Major V. M. Dumas
Commanding Officer, Air Service Depot, Morrison, Va.

Major Dumas was for over twenty years an officer of the Michigan National Guard, serving in '98 as well as on the Mexican Border in 1916. He has been organization officer in charge of construction squadrons and companies of the Air Service until his present assignment. As such he trained the commissioned and enlisted personnel of the Supply Section and to him is due much of the credit for the excellent showing these troops have made in England and France as well as in this country. Major Dumas' home is in Detroit, where he was engaged in the lumber business before entering the air service.

About July 1, according to Major Biddle, Baker was transferred as a flight commander to the Thirteenth aero pursuit group, with the rank of First Lieutenant. In August he was placed in command of the 141st Pursuit Squadron and sent to the rear to organize it. There was some delay, over which Baker had no control, in getting the squadron organized, and it was not until the middle of October that he was sent to the St. Mihiel front. About this time he was promoted to Captain. He was in command of 26 officers, 180 men and controlled 20 to 25 machines.

Capt. Hobart A. H. Baker, A. S.
Photo Underwood and Underwood

Major Biddle said that in bringing down his last German machine Capt. Baker did an exceptionally fine piece of work. The Hun was attacked 20,000 feet up. The German machine turned over and the observer fell out and dropped within the American lines. The German pilot, however, managed to right his machine and Baker again attacked him with the result that the German and his airplane fell about a mile within the German lines. After the armistice was signed, Major Biddle said, American aviators went over the front and examined the machine where it had fallen and found a quantity of German propaganda for circulation among American infantry.

Went Flying in 1916

"Hobey" Baker was the son of Mr. and Mrs. Alfred Thornton Baker of Philadelphia and Princeton. He was 26 years of age. After being graduated from college he entered the employ of J. P. Morgan & Co. In 1916 he became interested in aviation and entered the aviation school at Governors Island. He was made an officer in the Reserve Aero Squadron. That and the fact he was a licensed pilot when America entered the war caused him to be among the first of the American aviators to be sent abroad.

Perhaps no amateur athletic hero in recent years became so widely known and loved outside of his own college as "Hobey" Baker. He was a star halfback on the Princeton football eleven from 1911 to 1913 and captained the Tiger team in his senior year. It was at hockey, however, that Baker gained his greatest fame, for he undoubtedly was the greatest player developed on this side of the border, and was excelled only by a few of the Canadian professionals.

BALLOON WORK OF THE FIRST ARMY IN FRANCE

Kept Up with the Advance Under Very Trying Conditions

THREE JUMPS IN 24 HOURS

This Was Accomplished by First Lieut. J. A. McDevitt of the Eleventh Company on October 6

In a report from the commanding officer of the balloon companies of the First Army in France, to the Division of Military Aeronautics, covering the balloon activities during the Allied offensive between September 26 and November 11, it appears that the American Army lost 21 balloons. Fifteen of these were destroyed by enemy airplanes and six by shells. The enemy is believed to have lost during the same time at least 50 balloons. In driving off the enemy aerial attacks the American aircraft guns in this time shot down three planes; the Sixth Balloon Company, two in two consecutive days, and the Second Balloon Company, one.

The Eleventh Balloon Company was attacked four times on October 6, and First Lieut. J. A. McDevitt and Second Lieut. G. D. Armstrong each jumped twice. This made a total of four jumps for Lieutenant McDevitt, three within the same twenty-four hours.

First Lieut. W. J. R. Taylor, Sixth Company, and First Lieuts. B. T. Burt and J. A. Higgs, Seventh Company, made four jumps. Altogether, a total of approximately thirty parachute jumps were made during this offensive.

Continuing, the report said:

"The Infantry advanced from the Bois d' Bethainville line to Mouson Beaumont and Sedan within seven days. The balloons followed this advance with untiring and unceasing energy, operating during the day and advancing at night. The officers and men slept in the open, in cold and inclement weather, without shelter. This, to be sure, is only the hardship which the infantry endures. The infantry, however, is relieved. These balloon companies—many of them—have been on the front, without relief and with no leaves of absence, through the Chateau-Thierry, St. Mihiel and Verdun offensives. The problem of transporting a 1,000 cubic meter balloon over roads which our artillery has wrecked, through woods where trees overhang and endanger the cable, past traffic which was blockaded and jammed—this problem was faced and solved by the American Balloon Companies.

"The study of the map reveals that between 'H' hour on September 26, and 11 o'clock on November 11, when the armistice was signed, the American Balloons in the Meuse offensive made an aggregate advance of 425 kilometers. This estimate is computed by measurement in direct line. The actual road miles practically doubled the total above stated. Much of the transport, moreover, was conducted by hand—the balloons being taken over open fields, through country ridden by shell holes and strewn with barbed wire. In several instances the balloons were transported without a winch for distances of ten kilometers at a time. It is known that the balloons, in a few cases, were within twelve hours behind the infantry in crossing No Man's Land."

Major General C. P. Summerall, in a communication to the commanding officer of the Corps Balloon Group, commended the companies for their work, saying:

"The balloons have kept up with the advance under trying conditions, and although visibility has been difficult and sometimes impossible, the admirable spirit and readiness for duty has been most creditable."

SNAP SHOTS FROM ALOFT

The discovery, by the Bureau of Steam Engineering of the Navy Department and the Bureau of Mines, of a process whereby helium can be produced in quantity and at comparatively low cost is an event of such far-reaching importance that it can hardly be realized to its full extent. In brief this discovery actually opens a new era in aeronautics, for it virtually eliminates the most serious drawback of the airship, one which principally retarded its application to peaceful pursuits—its inflammable nature.

Helium, which the Navy Department camouflaged for reasons of national defense as ‘‘ argon ’’ as long as hostilities were proceeding, has two outstanding advantages over hydrogen, which gas had hitherto exclusively been used for filling airships and observation balloons; first, it is absolutely non-inflammable, and second, it does not form a detonating mixture when diffused in air. The latter feature of hydrogen caused the loss of various Zeppelin airships in times of peace, and was in fact a phenomen more dreaded by aeronauts than the mere inflammability of hydrogen, because a leaking gas chamber could bring it about most unexpectedly. Now that these two drawbacks, which had hitherto been considered inherent with airships, have successfully been overcome, one may confidently expect that the airship will ere long become one of the most important types of aircraft, in the pursuit of peace as well as of war.

Considered from the military point of view, the introduction of helium means that in future wars airships will no longer be compelled to seek safety in flight when attacked by airplanes, but will stand by and fight them. The speed of airplanes will always exceed that of airships; superior speed, or climb, will therefore still constitute the airplane’s greatest asset against airships, except that airplanes will have to use bombs instead of incendiary bullets in attacking lighter-than-air craft. And since in bombing work extreme high speed is not essential, it would seem as if the airships of the near future would be quite as able to protect themselves against airplane attack as battleships are when confronted by enemy torpedo boat destroyers.

If we now consider the commercial possibilities of this discovery, it is quite apparent that the airship will in a very short time also come into its own as a carrier of passengers, and even goods. The reasons for this are various, and rather obvious.

To begin with, the great buoyancy of airships will make it possible to carry large numbers of passengers, with their baggage, in comfortable cabins over much greater distances than it would be possible to achieve with airplanes. To be sure, the commercial speed of the airship will be inferior to that of the airplane, but against this drawback there must be put the much greater element of safety of the airship, due to its ability to float almost indefinitely regardless of engine failure. This asset will be a particularly valuable feature in overseas voyages; it will be no less important in solving the very real problem of navigating the air in foggy weather, for airships will be able to float over an air port with engines stopped until the fog clears away. The knowledge, on the part of the public, that the safety of aerial travelers is not dependent on engine reliability, and that a passenger airship will be about as unsinkable as a transatlantic liner, will also very materially hasten the advent of commercial airship navigation.

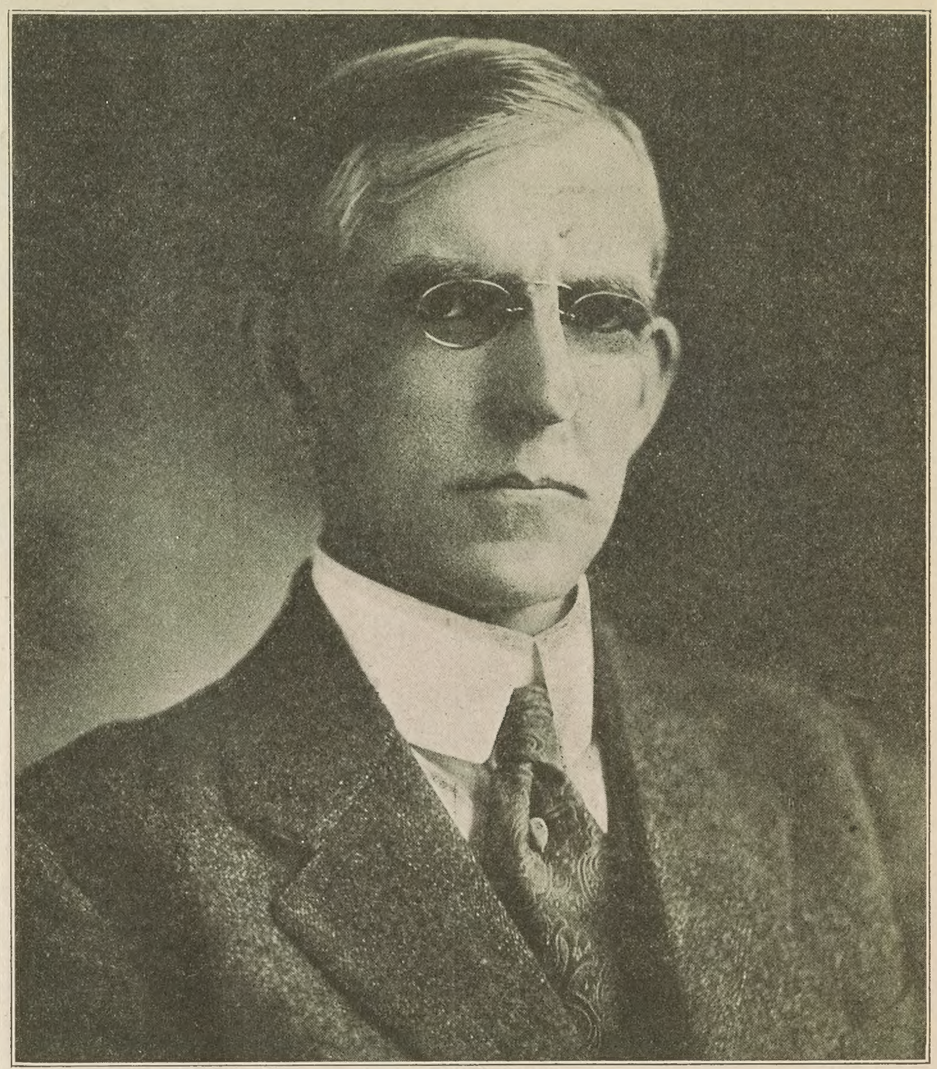
Therefore, the discovery of a process of industrially manufacturing helium should be hailed as one of the great contributions to the science of aeronautics, and constitutes a remarkable monument to American brains and enterprise.

* * *

When General March stated that returning troops would not be allowed ‘‘to sneak into the country’’ it was believed that this would make possible a demonstration on behalf of some Air Service units that are now back. But all atttempts to honor these men have failed and the ten thousand soldiers who have worked so faithfully in the upbuilding of the air service overseas will be demobilized without the public ever having a chance to know what fine types of men were secured for the flying branch of the army.

The navy had its celebration on the return of the battle fleet by a review by the leading government officials. Thousands of sailors and marines paraded Fifth Avenue and were cheered by a million happy friends of the navy.

If the Air Service is to have a morale which is not wholly interwoven with the army, no better means could be secured than some official welcome to the air fighters and their co-workers. The public has little realization of the number of men required to keep airplanes and balloons in the air and the great cost of air service upkeep. By seeing the men who have been so successful in England, France and Italy, in squadron formation an idea could be had of the size of this new branch of the Service.



F. G. Diffin
President, United Aircraft Engineering Corporation

For the past few years F. G. Diffin has been actively identified with aircraft work both in the Government service and through outside interests.

One of the first to urge standardization of airplane metal parts, Mr. Diffin was called to Washington early in the war to continue this work on a broader scale. Through his efforts early specification work was begun and standards adopted as a guide for domestic manufacture. At the same time the ground was prepared for the international adoption of standard aeronautical practices.

In February and March of 1918 at the International Aircraft Standardization Conference held in London, Mr. Diffin was chairman of the very able commission representing the United States Government. In recognition of his work at that time he was elected as a Fellow of the Aeronautical Society of Great Britain.

Throughout the rapid progress of aeronautical development in the past few years Mr. Diffin has been a prominent figure. He has likewise been actively identified with the work of the S. A. E. along aeronautical lines.

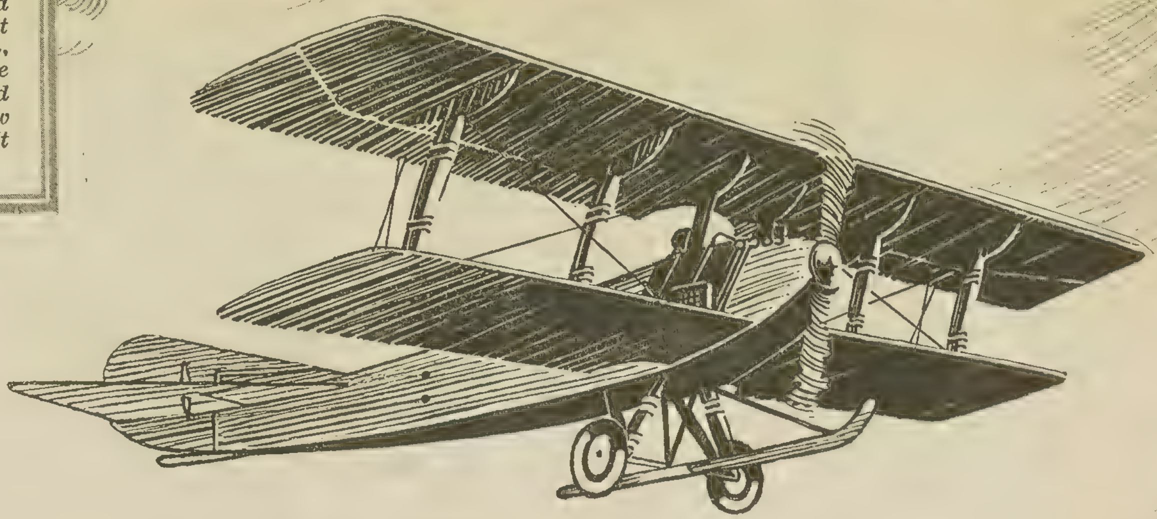
His activity is now turned through different channels but towards the same object, since he has recently been made President of the United Aircraft Engineering Corporation of New York City. This organization for the development of the aeronautic art and industry should form an efficient instrument for the forceful and effective application of Mr. Diffin’s energies.

Marine Fliers to Miami

Squadron D of the First Marine Aviation Force, under command of Capt. R. A. Presley, has arrived in the United States from Europe and has been ordered to proceed to marine flying field, Miami, Fla., for station. The other squadrons of the force will be sent to the same place upon arrival from the other side. Squadron B already is en route home, and Squadrons A and C will embark shortly.

An After-War Type

This new machine is built especially for commercial and sporting use by the Aircraft Engineering Corporation, New York. It is a small plane of sturdy construction and handsomely finished. Low first cost and low up-keep. It is Valsparred.



The Airplanes of Peace are Valsparred—

In the air-fleets of America and the Allies throughout the war Valspar proved its supremacy as the most reliable and durable varnish for the wood, metal and fabric of airplanes and seaplanes.

With the coming of peace the development of the flying machine takes another turn, and Valspar is again the chosen varnish of the leading manufacturers.

Many new types of planes, one of the latest of which is shown here, are being produced. They are Valsparred of course.

Valspar is proof against all kinds of exposure to water, air, sun, mud and dust, and also against the terrific vibration of air service. It won't turn white under the severest conditions. It resists oil and gasoline, acids and alkalies. It is a long-oil varnish of exceptional brilliancy and drying qualities and retains its elasticity long after ordinary varnishes have perished.

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CONGRESSIONAL COMMITTEES IMPERATIVE

(*Continued from page* 1)

May last year, was a large and representative one. It included such experts as Sir Richard Glazebrook, F.R.S.; Mr. G. Holt Thomas, the builder of the De Haviland type of airplane; Mr. Claude Johnson, the managing director of Rolls-Royce, Ltd.; Mr. F. W. Lanchester; Mr. T. Sopwith, builder of the well-known fighting scouts; Lieut.-Col. O'Gorman, Superintendent of the Royal Aircraft Factory from 1909 till 1916; Mr. J. D. Siddeley, engine builder; Major-General Ruck, C.B., ex-chairman of the Aeronautical Society of Great Britain; Mr. H. G. Wells, Mr. Butler Aspinall, K.C., Mr. Balfour Browne, K.C., Brig.-General Brancker, R.F.C.; Captain Vyvyan, R.N. A. S.; Col. J. W. Pringle (Board of Trade), Sir Mackenzie Chalmers (Home Office), Sir Laurence Guillemard (Board of Customs and Excise), Mr. G. E. P. Murray (Post Office), Mr. G. E. A. Grindle (Colonial Office), the Duke of Atholl, Lord Sydenham, Lord Montague of Beaulieu, Lord Drogheda (Foreign Office), Mr. Joynson-Hicks, M.P., Mr. Tyson Wilson, M.P., Mr. A. E. Berriman, Mr. G. B. Cockburn, Mr. H. White-Smith, and representatives of all the self-governing Dominions. Lord Northcliffe, who was the original chairman, had time only to preside at the first meeting before he left for the United States as head of the British War Mission. Major Baird, M.P., was the deputy-chairman.

Committee Divided

"It was soon found that the Committee was far too large, and accordingly it divided into several special committees, the most important perhaps being No. 1, under the chairmanship of Lord Sydenham, whose task was to advise on policy and necesary legislation, with special reference to:

"(1) The attitude to be adopted by the State with regard to national sovereignty in the air, and international questions connected with aerial transport.

"(2) The question of State ownership (if any) or of necesary State control and regulation of Customs, quarantine and aliens.

"(3) Necessary amendment of the common and statute law as to the air covering private property, and as to compulsory purchase of land for aerodromes and landing grounds.

"(4) The principles of liability for damages caused by or to aircraft.

"These questions raised at once the initial difficulty of the sovereignty of the air, that is to say, whether the old doctrine that the owner of a piece of land possessed rights *usque ad coelum* existed up to the present moment and should exist for all time. This question had been discussed as an international one when a Convention sat in Paris in order to deal with the rights of international aviation, and that Convention failed largely over this question, the Germans holding that it was idle to restrict the right of flying over private lands and claiming 'the freedom of the air' in a sense which would allow of machines flying, for example, over Portsmouth Harbor. The British delegates, on the contrary, having in view, perhaps, what afterwards occurred, took the contrary view, and held that there must be sovereign rights in any State to control the passage and use of its own air. The Committee came to the conclusion that in any legislation there must be an assertion of the 'sovereignty and rightful jurisdiction of the Crown over the air superincumbent on all parts of His Majesty's Dominions and the terriltorial waters adjacent thereto.' They added that, in their opinion, the ordinary three-mile limit of territorial waters would not be sufficient for what may be called 'territorial air,' and they redrafted the original International Convention for submission to the Foreign Office, and, it is hoped, for the consideration of another conference to be called shortly. It may be recalled that a few days before Parliament rose Mr. Joynson-Hicks asked the Government whether they were taking any steps to call such a conference, and the Foreign Office replied that they hoped shortly to be able to make a statement on the subject. It is regarded as of the highest importance that this conference should be called immediately. At present there are no regulations governing flying on the Continent or foreign flying here. Methods of identification, of inspection of passports, of Customs, the provision of landing stages, and the thousand and one matters which require consideration and settlement in regard to the new method of transport are still unsettled, and, whether or not Germany takes part in the conference, it is essential, in order that the change from military to civil aviation should not be delayed and complicated, that the conference should get to work at once.

Aerial Navigation Bill

"Committee No. 1 also drafted the clauses of an Aerial Navigation Bill dealing with such points as the qualifications for owning aircraft, registration, certificates of air-worthiness, certificates of officers, regulations dealing with collisions, identifications, papers, signals, customs, and the Post Office.

"The other important question which came before the Committee was the ownership of air by the individual landowner, and the Committee came to the conclusion that no action for trespass should lie, except for material damage, but that a right of action for trespass should include one for injury caused by the assembly of persons on the landing or ascent of aircraft elsewhere than at authorized aerodromes, and in an action for trespass the obligation on the aviator should be absolute, it not being necessary to prove negligence against him. Under the present law grave damage may be caused to a man or his property by a moving vehicle without any right of redress. If, for instance, a man is run over in the street by a motor-omnibus he cannot obtain damages unless he proves that the driver was in some way negligent, but the Committee felt that in the case of a machine falling from the skies killing or injuring either the landowner or, say, his poultry, it would be impossible to prove negligence on the part of the airman, and that accordingly in such a case the actual machine causing the damage should be responsible, even though the fall might be caused by collision with another machine whose pilot was the guilty party.

Scientific and Technical

"The second Special Committee dealt with the scientific and technical side of aeronautics with a view to ascertaining what could be done in commercial transport by the then existing machines, and they took as their standards four machines—the Handley-Page, the DeHaviland, the R.E.8, and the Sopwith 'Pup.' The two airplanes which the war has shown to be suitable for commercial aviation are the big Handley-Page, one of the largest of which recently flew over London with 40 passengers, and the DeHaviland type of large bomber. The DeH. 10, which has been evolved from the DeH. 4 since the Committee sat, is the machine which Mr. Holt Thomas proposes to use in his flights from London to Paris.

Six Definite Conclusions

"The Committee arived at six definite conclusions about airplanes, as follows:

"(1) That for commercial success speed is probably the most material factor.

"(2) That for commercial success the speed needed depends very largely on the conditions of competing methods. Between large centers connected by di

(*Continued on page* 8)

PROGRESS

The Modern Battle Plane
1918

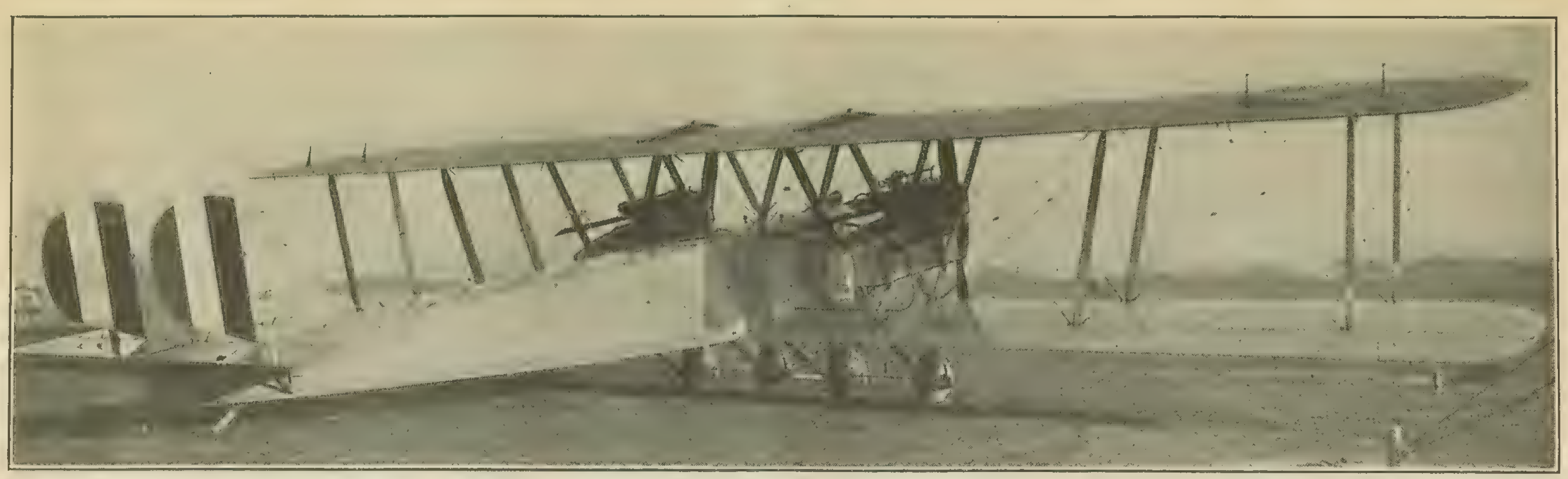
The first heavier-than-air
machine produced by the
Wright Brothers in 1903

Manufacturers for the United States Government

The Dayton Wright Airplane Co.

DAYTON, OHIO

"The Birthplace of the Airplane"



THE MARTIN NIGHT BOMBER

THE MOST IMPORTANT AERIAL DEVELOPMENT OF THE WAR

Officially, it has surpassed the performance of every competitor.

MARTIN U.S.A.

The skill and ability of the HOUSE OF MARTIN continue to maintain Supremacy of Performance and Dependability which they have held since 1909.

THE FORERUNNER OF THE WONDERFUL

AERIAL FREIGHTER AND TWELVE-PASSENGER AIRPLANE

THE GLENN L. MARTIN COMPANY, Cleveland

Contractors to the United States Government

CONGRESSIONAL COMMITTEES IMPERATIVE

(*Continued from page 6*)

rect high speed railways, speeds of 100 miles per hour are desirable; but for linking places between which the railway service is slow or interupted by sea crosings, lower speeds will be found commercially practicable.

"(3) That at present stages of about 500 miles would be the normal limit, but that it will be desirable from the comcercial point of view that stages should be as long as possible.

"(4) That it is desirable as speedily as possible to develop the existing facilities for night flying, especially for the carriage of mails.

"(5) That heavy loading is necessary for commercial success, but since this will involve a high landing speed, development of land and air brakes is necessary.

"(6) That in view of certain disadvantages of high landing speed, efforts should be made to keep loading as low as possible consistently with securing a commercial rate of speed, and to provide for aerodromes and landing places possessing the best possible surfaces, and that it may well be hoped that future inventions and improvements in design will enable a lower landing speed to be attained without sacrifice of flying speed.

"The Committee also had to consider whether there was a possibility of unexpected inventions modifying the lines of present development, but they came to the conclusion that this was not so, and that while there would be considerable development in the existing appliances for flying there was no prospect of more than quantitative modifications of existing conditions. The existing airplane will be improved. Such things as folding wings, already used in the Handley Page machine, will, no doubt, be increased, and an all-around improvement in engines is still certain to come. A very great improvement has taken place, in fact, since the Committee sat, and the Liberty engine may, though it is not yet certain, revolutionie aerial navigation.

"The Committee felt that every effort should be made by State aid or State encouragement to widen the basis of fuel production and to prevent the great interests both of aerial navigation and of automobilism being dependent on fuel of any one kind, particularly if it comes from overseas. The importance of this point has been emphasized during the recent war, in which the civilian consumption of petrol has been so severely restricted. The Committee also considered at great length definite air routes, such as from London to Edinburgh, Glasgow, Dublin, the Riviera, Russia, and South Africa.

Landing Grounds

"The mere provision of airplanes is a small part of the question of commercial aviation. The provision of aerodromes and landing stages is urgently needed, and without compulsory powers of purchase, of course, is more difficult. The whole question of landing grounds, in regard to which the military side of aviation has afforded ample experience, had to be considered, and the Committee concluded that landing grounds should:

"(1) Bear some reference to the direction of the main aerial routes;

"(2) Be sufficiently far from the centers of cities to be fairly clear of houses in the direction of flight;

"(3) Be unlikely to be shut in by buildings in the immediate future;

"(4) Be as far as possible clear of railways, telegraphs, trees and other obstructions;

"(5) Be situated on ground as far as possible free from mist or fogs;

"(6) Be provided with adequate water supply, telephone connections, and good facilities for rail, tram, omnibus and motor traffic with the different districts of the cities to be visited;

"(7) Be capable of expansion.

The Second Committee also came to the conclusion that the use of aircraft would be advantageous:

"(1) In the case of mails, by competing with the telegraph service, or by establishing a new type of express letter service;

"(2) In the case of passengers, by affording rapid transit over long distances, particularly where the journey includes a sea crossing; and

"(3) By enabling ordinary merchandise, commercial samples, etc., to be carried more rapidly than by any other means.

"The Committee, however, came to the conclusion that probably one of the first methods of employing airplanes for the transport of passengers might lie, not in a regular service, but in the occasional and increasing use of single machines for rapid journeys, and this appears to be the line upon which development may be expected to take place, as exemplified in Mr. Holt Thomas's scheme mentioned above.

"The third, fourth and fifth special committees were of a more technical character. The third dealing with production throughout the Empire of the necessary types of aircraft for organized aerial services, the fourth with the possibility of setting up a model type of industrial organiation applicable to the whole of the labor employed in aircraft manufacture and transport; and the fifth with aeronautical inventions and experiments, research in regard to meteorology, and investigation of accidents.

Socialism or Individualism

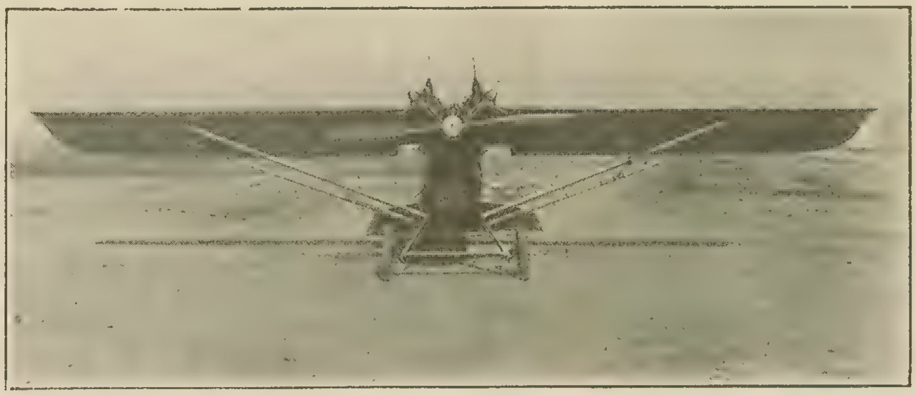
"One question was discussed in several of the committees and in the Main Committee, which will have to be settled by Parliament—namely, whether commercial flying is to be undertaken as a big experiment in State Socialism, or whether it is to be entrusted to individual enterprise, supplemented, so far as landing stages are concerned, by the assistance of theexisting ilitary organization or the exercise by the State of compulsory power of purchase. Some members of the Committee were obviously inclined to favor a State experiment, but Committee No. 1, presided over by Lord Sydenham, reported in favor of State encouragement of private enterprise, and against what may be called a State Socialistic experiment. It is claimed by many that the new industry should be as free from State control as possible. A private firm, it is urged, can properly risk its capital in exploiting a promising new invention or development, but a State department would be in the position of a trustee, would think twice or thrice before risking the necesary funds, and would be responsible to Parliament for its action. During the war the Air Council has admittedly made bold experiments, but it is pointed out that in doinng so the Department has been untrammeled by Parliament, and has been free to incur an expense unthinkable in peace time."

Airplane Material May Be Exported

Cotton airplane duck and rubberized silk suitable for use in the manufacture of aircraft are among the articles named by the War Trade Board as having been removed from the Export Conservation List, effective on Dec. 20.

Wood suitable for airplane propeller blades; veneers for airplane and seaplane bodies, and airplane and seaplane frames are also removed from the Export Conservation List, effective from Dec. 24.

It is also announced that restrictions have been lifted on the importation of mahogany logs and mahogany timber, and that licenses may now be issued freely.



THE RECORD BREAKING LOENING MONOPLANE—THE WORLD'S FASTEST SUCCESSFUL TWO-SEATER.

Designed and constructed by Grover C. Loening for the Wright-Martin Aircraft Corp., and subsequently taken over by the U. S. Army Air Service.

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Consulting Engineer

Announces the establishment of the new laboratory
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at

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NEW YORK CITY

With complete and efficient facilities for the
study, development and construction of
new types of aeroplanes.

"THE OPE

Curtiss Achievements

1—The design and construction of the fastest fighting airplane ever fl
Official Government records credit this triplane, which was built for the U
Navy, known as model 18-T, with 160 miles per hour, carrying full mili
load, pilot and passenger. This is 15 miles per hour faster than any s
ever claimed for an airplane, a truly epoch-making achievement, made pos
by the development of our new model K. motor.

2—The design and construction for the Navy of the largest flying boats in
world, colossal crafts capable of carrying five tons useful load. It was
of these boats that recently carried fifty passengers.

3—The design and construction for the U. S. Navy of the fastest and most
cient Seaplane in service anywhere. This craft, which is known as the Cu
model H-A, with Liberty motor, made an official speed of 126 miles per
with full military load, armament, ammunition, pilot and passenger.

The Curtiss Engineering Corporation is today the center of aeronau
coming of peace. Glenn H. Curtiss and his engineers have been busy in d
carrying forward the production of suitable commercial types. Aircraf
are already available, and are as superior in design, workmanship and per

CURTISS ENGINEERING CO

tiss

BOOK”

The Great War

The development and construction of a 12 cylinder, 400 H.P. motor of an entirely new and much lighter type, known as the Curtiss model K-12. These motors have undergone exhaustive tests and are already in production.

The development and construction of the Curtiss model K-6, a new and much lighter 6 cylinder motor. This engine develops 160 H.P. and possesses greatest endurance and reliability.

The development and construction on a large scale of the Curtiss OXX motors, and the J-N-4 training planes, which were used almost exclusively by the United States and Canada and largely in England for the training of American and British aviators. The training of over seven-tenths of the original land and marine flying pilots, most of whom entered the service and formed the nucleus of the United States Aerial Training Forces.

ent. Its activities, instead of being decreased, will be increased by the research laboratories, wind tunnels and shops in perfecting designs and signed for sportsman's use, mail carrying and other peace-time purposes rtiss military planes have proved themselves to be.

TION, GARDEN CITY, L. I.

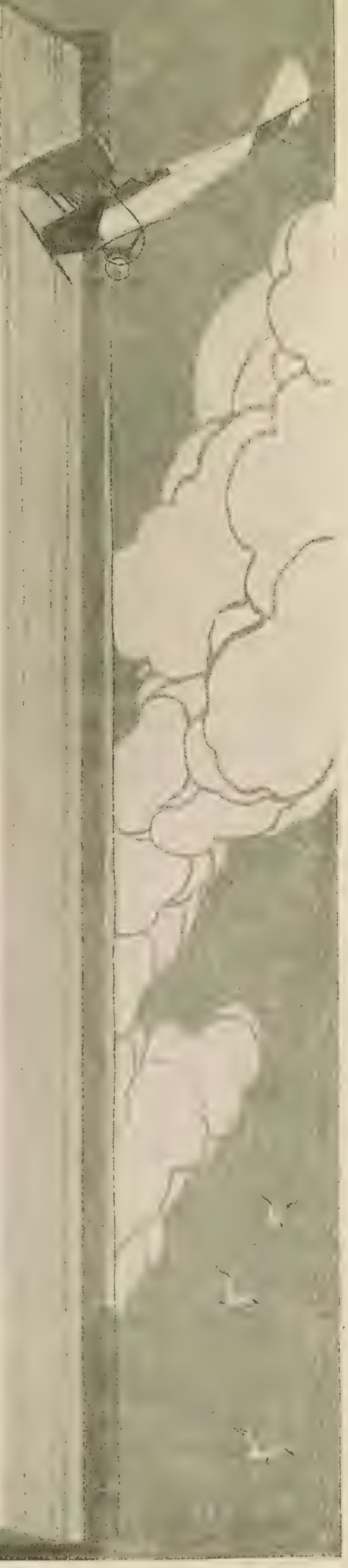
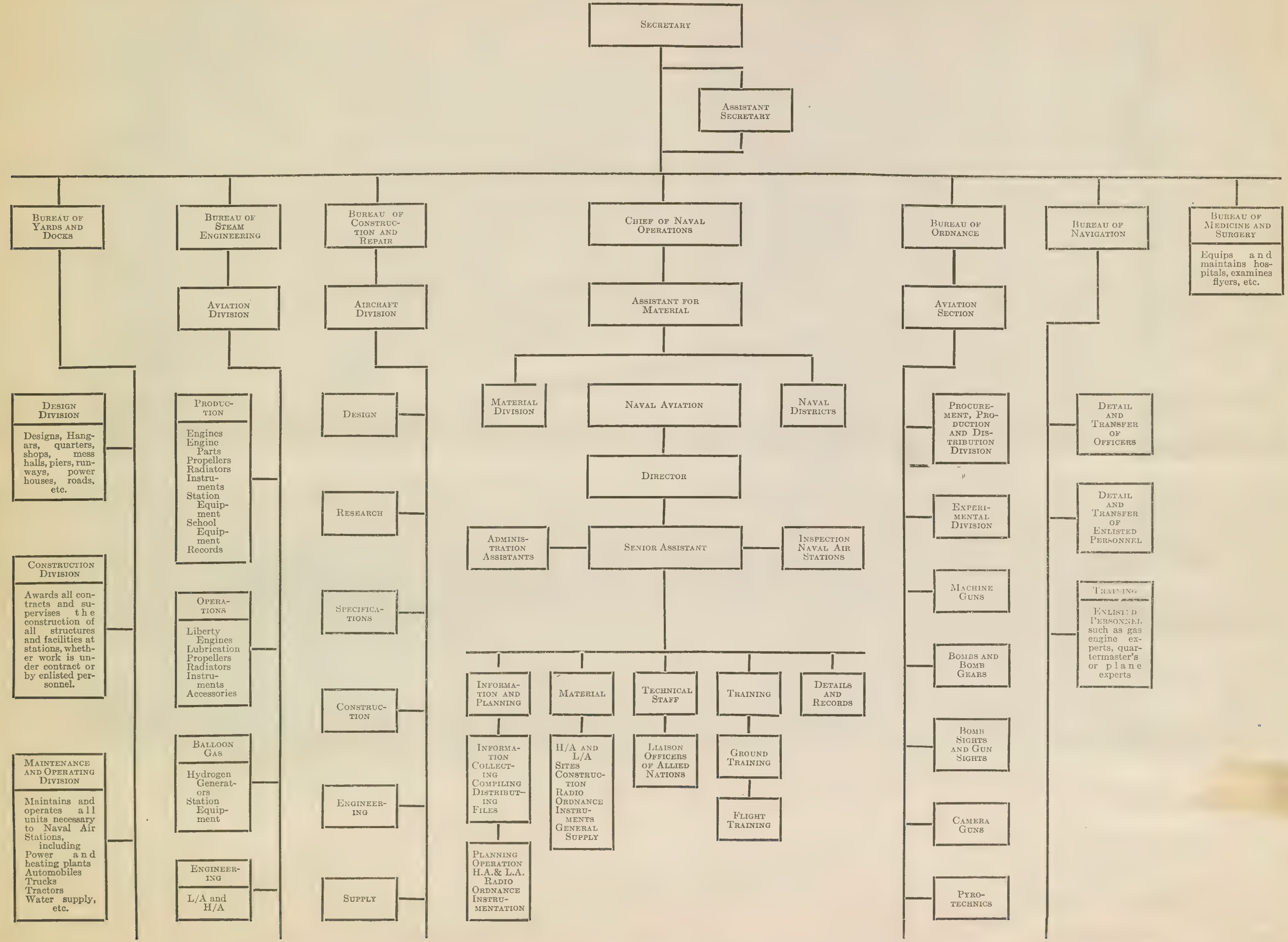


Chart of Navy Department Showing Allocation of Aviation Activities


SECRETARY
ASSISTANT SECRETARY
BUREAU OF YARDS AND DOCKS
DESIGN DIVISION
Designs, Hangars, quarters, shops, mess halls, piers, runways, power houses, roads, etc.
CONSTRUCTION DIVISION
Awards all contracts and supervises the construction of all structures and facilities at stations, whether work is under contract or by enlisted personnel.
MAINTENANCE AND OPERATING DIVISION
Maintains and operates all units necessary to Naval Air Stations, including Power and heating plants Automobiles Trucks Tractors Water supply, etc.
BUREAU OF STEAM ENGINEERING
AVIATION DIVISION
PRODUCTION
Engines
Engine Parts
Propellers
Radiators
Instruments
Station Equipment
School Equipment
Records
OPERATIONS
Liberty Engines
Lubrication
Propellers
Radiators
Instruments
Accessories
BALLOON GAS
Hydrogen Generators
Station Equipment
ENGINEERING
L/A and H/A
BUREAU OF CONSTRUCTION AND REPAIR
AIRCRAFT DIVISION
DESIGN
RESEARCH
SPECIFICATIONS
CONSTRUCTION
ENGINEERING
SUPPLY
CHIEF OF NAVAL OPERATIONS
ASSISTANT FOR MATERIAL
MATERIAL DIVISION
NAVAL AVIATION
NAVAL DISTRICTS
DIRECTOR
ADMINISTRATION ASSISTANTS
SENIOR ASSISTANT
INSPECTION NAVAL AIR STATIONS
INFORMATION AND PLANNING
INFORMATION COLLECTING COMPILING DISTRIBUTING FILES
PLANNING OPERATION H.A.& L.A. RADIO ORDNANCE INSTRUMENTATION
MATERIAL
H/A AND L/A SITES CONSTRUCTION RADIO ORDNANCE INSTRUMENTS GENERAL SUPPLY
TECHNICAL STAFF
LIAISON OFFICERS OF ALLIED NATIONS
TRAINING
GROUND TRAINING
FLIGHT TRAINING
DETAILS AND RECORDS
BUREAU OF ORDNANCE
AVIATION SECTION
PROCUREMENT, PRODUCTION AND DISTRIBUTION DIVISION
EXPERIMENTAL DIVISION
MACHINE GUNS
BOMBS AND BOMB GEARS
BOMB SIGHTS AND GUN SIGHTS
CAMERA GUNS
PYROTECHNICS
BUREAU OF NAVIGATION
DETAIL AND TRANSFER OF OFFICERS
DETAIL AND TRANSFER OF ENLISTED PERSONNEL
TRAINING
ENLISTED PERSONNEL such as gas engine experts, quartermaster's or plane experts
BUREAU OF MEDICINE AND SURGERY
Equips and maintains hospitals, examines flyers, etc.

NAVY'S PLEA FOR LARGE AIR FORCE

Admiral Taylor and Capt. Steele Present Strong Arguments

INTERESTING DISCLOSURES

General Information Concerning Lighter-Than-Air Craft Now Made Public for the First Time

Before the Committee on Naval Affairs of the House, Capt. G. W. Steele and Admiral David W. Taylor recently gave arguments for a large naval air force that should appeal to the country as convincing. Much of the general information regarding lighter-than-air craft is released for the first time.

The statement shows that only about $8,000,000 is to be expended for heavier-than-air equipment, but much experimental work is to be expected.

Parts of the hearing follow:

Capt. Steele: The amount asked for in the revised appropriation will be much less than that named in the bill here; that is, $225,000,000. As the clause is now proposed it is as follows:

Aviation: For aviation, to be expended under the direction of the Secretary of the Navy, for procuring, producing, constructing, operating, preserving, storing, and handling aircraft, for the establishment and maintenance of aircraft stations, including the acquisition of land by purchase, donation, or condemnation, and for experimental work in the development of aviation for naval purposes, $85,649,300.

This estimate is made up of the types of machine that we think we will have to have before the end of June, 1920, and includes the acquisition of land and erection of stations to a certain extent to fill out the General Board's program for the defense of the coast and the insular possessions.

The heavier-than-air craft are divided into fighting escorts, of which we will want 108, at a cost of about $10,000 apiece; 54 large patrol machines, at $24,000 apiece; 54 small patrol machines, at $14,000 apiece; fleet types, which have yet to be developed, 108 at $10,000 each; 300 school machines, at $6,500 each; and a general sum to be expended for experimental work for the development of heavier-than-air craft, of $2,000,000, making a total for heavier-than-air craft of $8,162,000.

The Chairman: What is the ordinary life of a machine?

Capt. Steele: The best information that we had on the life of a machine in war time, upon which the estimates for the number of machines that we would construct were based, was obtained from abroad, and that was made on a basis of a replacement every three months. But we have found that the replacements are not required as fast as that.

The Chairman: What is the expected life of a machine in peace time?

Capt. Steele: One year. The machines are very frequently wrecked, because they are brought down in rough weather. They have to land on the sea for some reason or other—some fault of the mechanism—and, in the absence of vessels which can go out and hoist them on board, they attempt to tow them in, and by the time they get them to shore they are a complete wreck.

The Chairman: What part of the cost of the machine does the engine represent?

Capt. Steele: The fighting escort, for example, costs $10,000, and the engine will cost $6,000.

The Chairman: What would be the length of life of an engine until it would have to be scrapped completely—80 hours?

Capt. Steele: I do not know where the committee got the idea of 80 hours, because they usually first overhaul these engines after about 70 hours' running. From the best information we have now, the life of these engines is about 400 to 500 hours.

Mr. Browning: What are you going to do with 108 fighting escort machines?

Capt. Steele: All these machines are to maintain the coastal patrol stations and go with the fleet, and these fighting escorts are to match some machines that have been developed by the enemy, and if we do not have the fighting escorts our machines will not be able to compete with them.

The Chairman: They surrendered all their machines, did they not?

Capt. Steele: They are going to; yes, sir; and this machine that they have is superior to anything that the Allies had in the way of flying boats on the European front.

The Chairman: But do you count under existing conditions Germany as capable of building machines and resurrecting a difficulty?

Capj. Steele: No, sir. But I am not considering that Germany is our only possible enemy. All the Allies would know about this fighting escort as well as we do.

Mr. Kelley: Just state, as near as you can, the general policy of your bureau for a peace basis. What stations are you going to keep up, how many men are you going to ask the Congress for, etc.?

Capt. Steele: The stations that are intended to be maintained are all of those now situated on the Atlantic coast, with the addition of a number on the Pacific coast recommended by the General Board. Board.

The Navy Department has been contemplating establishing air stations on the Pacific Coast, but refrained from doing so during the period of the war because of the fact that the only nations on our western seaboard were allies, and that the establishment of these stations might be misconstrued. The plan has been in mind ever since naval aviation started to establish coastal stations, and this plan of the General Board contemplates a permanent establishment of coast defense.

Mr. Kelley: How many stations have they recommended and at what points?

Capt. Steele: Main stations at San Diego; San Francisco; Port Angeles, Wash.; Columbia River; Seward, Alaska; Pearl Harbor, Hilo, Hawaii; Port Apra, in Guam, and Cavite.

Mr. Kelley: Which of those have already been authorized?

Capt. Steele: San Diego is the only one, sir.

The Chairman: You spoke of "main stations." Before you get away from the Pacific coast, tell us if you have some subsidiary stations on the Pacific that are contemplated.

Capt. Steele: There are 25 rest stations recommended for the Pacific.

Mr. Butler: What do you mean by "rest stations"?

Capt. Steele: Those are just points where they have a fuel tank and a place to beach the machine so that they can refuel.

Mr. Kelley: You can put in the hearings just your estimate for the cost of operating each station?

Capt. Steele: Yes, sir.

(The statement referred to is as follows:)

Item "Operations coastal stations, $8,000,000." was divided as follows:

Heavier than air............	$6,000,000
Lighter than air............	2,000,000

Heavier Than Air

Estimate based on 237 seaplanes or 13 1-6 squadrons, and figures were based on estimates for training station; while expenses in some cases would be greater for a patrol station than for training, they would be less in others, and it is thought they would about even up. Therefore, as the estimates for 4 squadrons for training were $2,000,000, estimate for 12 squadrons patrol (the number 13 1-6 reduced to 12) is $6,000,000. In arriving at the above number of seaplanes, the stations now operating were assumed to continue, and proposed stations on east coast and Gulf were assumed to be established and operating by January 1, 1920.

No allowance was made for proposed stations in Pacific, as it was thought that the original estimate for establishing them would be sufficient to run them for a while, if any were completed before the end of the next fiscal year.

Lighter Than Air

Estimate is based on 31 dirigibles and 57 kite balloons. This does not include proposed stations on the Pacific coast and Pacific insular possessions, and assumes that proposed Atlantic and Caribbean coast stations will not be in operation before January 1, 1920.

The Chairman: What type of an engine are you contemplating?

Capt. Steele: The Navy has in view an engine recently developed, which is a possible development over the Liberty engine. And then there are smaller engines to be used in smaller planes which operate from the decks of ships, and the probability of the development of this we cannot foresee, because it is very rapid and we want enough appropriation to get the best as it comes along.

The Chairman: What did you estimate that the engines will cost you?

Capt. Steele: For the fighting escorts they are estimated at $6,000 apiece, and for the patrol and fleet types $4,000 apiece, and for the school types $2,500. I do not know whether they will be more or less after the war, sir. I will give now the continuation of the detailed statement. For lighter-than-air craft, kite balloons, 560, at $4,000 apiece; 114 twin engine coastal dirigibles, nonrigid type, $75,000 apiece; and 12 large nonrigid dirigibles, at $250,000 apiece; 4 rigid dirigibles, at $1,500,000 apiece; 10 free balloons, at

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Their SIMPLICITY STRENGTH and SERVICE
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Weight 96 pounds complete with tires built for craft weighing 2500 pounds
WHEELS and LANDING GEARS built for any size machine
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THE ACKERMAN WHEEL COMPANY
542 Rockefeller Building, CLEVELAND, OHIO. U.S.A.

$25,000 apiece; total lighter-than-air craft, $19,615,000. The engines for those are estimated at $1,303,600.

Instruments, including radio sets, $500,000; winches for kite balloons, $300,000, that is, 100 at $3,000 apiece. Operation of coastal stations, $8,000,000; expansion of coastal stations, $42,460,000; operation of training stations, $3,000,000; experimental work not otherwise covered, $3,000,000; for clerical and drafting and technical force, $300,000; that has been reduced by $5,000,000 by eliminating Guantanamo and Samana Bay. To go a little more into detail, it is proposed to have two squadrons of fighting escorts of 18 each, and one for replacement; one training squadron. This all refers to fighting escorts, which gives you the total of 108. This type is called the Dunkirk type, which was first tried out last spring, and makes a speed of 108 knots an hour, each armed with 4 machine guns and 2 light bombs.

Also there is being experimented with a machine called the Curtiss triplane, tried out last August and developed a speed of 140 knots an hour. It was designed and built by a man named Kirkham of the Curtiss Engineering Plant.

The large patrol craft are the twin engine tractors of the F-5 type, with a speed of 77½ knots an hour, armed with two 500-pound bombs and 4 machine guns.

The stations recommended by the General Board are as follows: Chatham, Mass., 24 seaplanes; Narragansett Bay—which has not been established yet—24 seaplanes; Rockaway, Long Island, 24; Cape May, N. J., 18; Hampton Roads, Va., 24; Morehead City, N. C., 12; Brunswick, Ga., 18; Miami, Fla., 12; Key West, Fla., 24; Galveston, Tex., 24; Canal Zone, 24; St. Thomas, West Indies, 18; San Francisco, 24; Seaward, Alaska, 6; Pearl Harbor, Territory of Hawaii, 24; Hilo, 12; Port Apra, Guam, 12; Cavite, 24, and San Diego, 24.

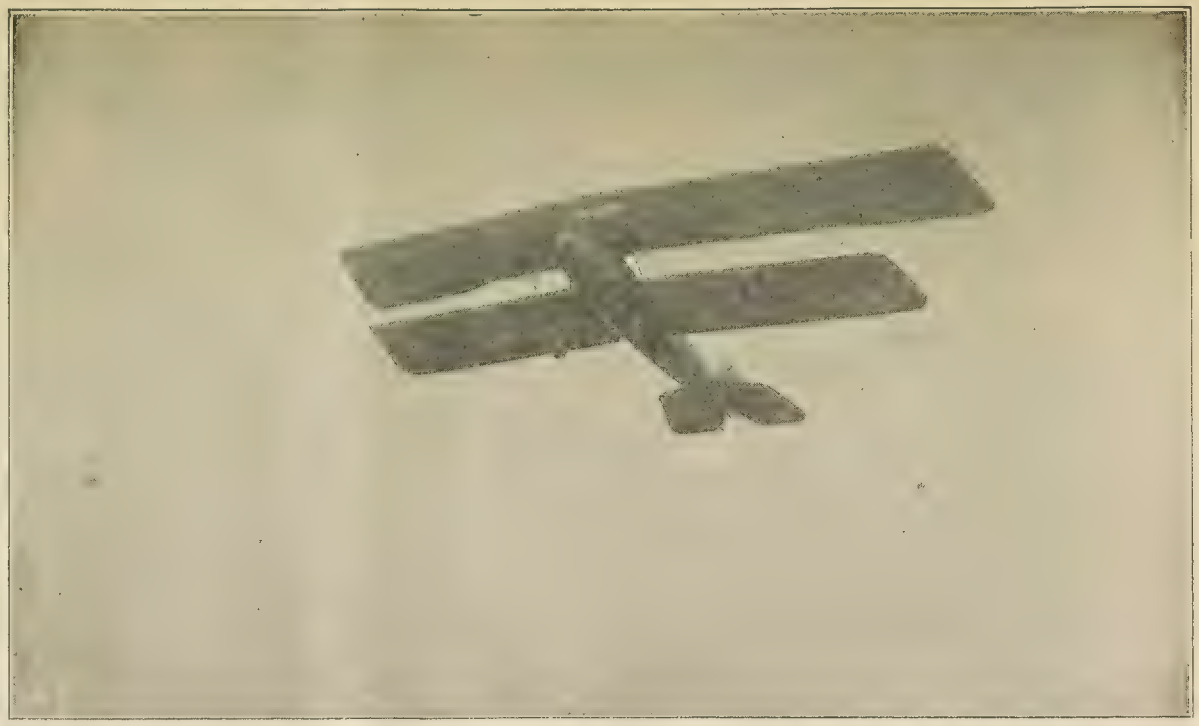
THE CHAIRMAN: Of those, which ones have been established already?

CAPT. STEELE: That totals 372. Of these, the following have not been established: Narragansett Bay, St. Thomas, San Francisco, Seward, Pearl Harbor, Hilo, Port Apra and Cavite. The stations at Morehead City, Brunswick and Galveston, Tex., are under construction, but not yet completed.

The above figures refer to seaplanes operating at those stations and it does not include lighter-than-air craft. The small patrol type of flying boat, which is requested, covers two squadrons of 18 each, and a replacement of 50 per cent, making 54, of the HS-2 type now in general service with a speed of 78.2 knots an hour, armed with two 230-pound bombs and one machine gun. The fleet type has not been developed, but it is estimated that we will require two squadrons of 18 each, one squadron for replacement, one training squadron of 18, and full replacement of that, 18 more, making 108.

The school airplanes for instruction purposes are estimated at 300 and are of the N-9 float type, and the small boat type.

Also aeroplanes to operate from the land or the decks of ships of what are called JN-4 and Thomas-Morse types. It is expected that the most important accomplishments of naval aviation for the fiscal year 1920 will be experimental. Under lighter-than-air craft, take kite balloons. These are balloons which are towed by vessels and have no engine in them, but are used for observation purposes, hunting mines, and submerged obstructions, noting the fall of shots from firing vesels, etc. It



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is proposed to locate kite balloons at the following stations, with the numbers as mentioned: Boston, 6; Narragansett Bay, 6; New York, 6; Cape May, 6; Hampton Roads, 6; Yorktown, Va., 12; Charleston, S. C., 6; Brunswick, Ga., 6; Key West, 6; Pensacola, 6; Galveston, Tex., 6; St. Thomas, 6; Port Angeles, 6; Columbia River, 6; San Francisco Bay, 6; San Diego, 6; Seward, Alaska, 4; Pearl Harbor, 6; Hilo, 6; Port Apra, 6; Cavite, 6—making a total of 136, and these, based on past experience, do not last longer than three months.

THE CHAIRMAN: You say the life of the kite balloon is three months?

CAPT. STEELE: Yes, sir.

THE CHAIRMAN: What is the cost of the kite balloon?

CAPT. STEELE: $4,000. Under the twin-engined coastal dirigibles, based on the General Board's report, we would have at some point in New England, between Rockland and Portland, which has not yet been located, 4 of these airships; 2 at Chatham; 4 at Montauk; 4 at Cape May; 4 at Hampton Roads; 4 at Charleston; 2 at Miami, Fla.; 2 at Key West; 2 at Port Arthur; 2 at the Canal Zone; 4 at St. Thomas; 4 at Port Angeles, Wash.; 4 at Columbia River; 4 at San Francisco Bay; 2 at San Diego; 4 at Seward, Alaska; 4 at Pearl Harbor; 4 at Port Apra, and 4 at Cavite, making a total of 68, with 34 emplacements.

Next is large nonrigid dirigibles. The Secretary of the Navy has given orders to draw up plans for the construction of 12 large nonrigid dirigibles, and the plans are being prepared. They are to be used for extended patrols, in conjunction with the fleet, and in scouting. Then we will require 10 free balloons for training purposes. Those are spherical balloons, with basket below them, that you send up and float away. The pilots who are to operate the kite balloons and dirigibles get their first instruction in free balloons.

We had very little data upon which to base the estimate for kite-balloon winches. This is a special type of winch that is installed on vessels which are designated to carry kite balloons, and we did not know what vessels were going to be designated, and so we estimated 100 of them at $3,000 apiece, and they are not to be ordered unless we have need of them.

Under the estimate for instruments is included radio outfits, compasses, air speedometers, clocks, altimeters, inclinometers, barographs, patent fire extinguishers, etc.

The operation of coastal air stations is to include the cost of operation of all patrol stations at home as listed in above under aeroplanes, dirigibles and kite balloon estimates. Existing stations have expanded so rapidly that it has been impossible to obtain accurate data as to the cost of operation of a typical station.

The next is expansion of coastal stations. The following stations are to be established, and the expenditures will under this appropriation depend upon when we get the work started: For the New England airship station is estimated $1,750,000. That is to be on the Maine coast between Rockland and Portland. They have all been enumerated in the estimates, but the station is not there yet. We want in this appropriation both the station and the aeroplanes or airships to operate them with: Narragansett, seaplane and kite balloon station, $1.365.000; New York, airship station, $2,250,000; Port Arthur, Tex., airship station, $1,750,000; St. Thomas. West Indies, $2,865,000; Canal Zone, $2,490,000. Lighter-than-air experimental station, recommended by the Bureau of Construction and Repair, $8.200,000.

The following is a summation of the estimated costs of construction of all stations proposed and recommended in the General Board's plan of patrol and protection, except the stations at Guantanamo and Samana Bay and all rest stations on the Pacific coast and Pacific islands.

ATLANTIC AND GULF COASTS AND CARIBBEAN SEA	
New England airship station..	$1,750,000
Narragansett Bay seaplane and kite balloon station....	1.365,000
New York airship station.....	2,250,000
Port Arthur airship station...	1,750,000
Sir Thomas airship and kite balloon station	2,865,000
Canal Zone seaplane, airship, and kite balloon station....	2,490,000
Lighter-than-air experimental station	8.200.000
Expansion of existing station.	6,310,000
Total..................	$26,980,000
PACIFIC COAST, ALASKA, AND PACIFIC ISLANDS	
Port Angeles airship and kite balloon station	$2,033,000
Columbia River airship and kite balloon station........	2,033,000
San Francisco airship, kite balloon, and seaplane station..	3,250,000
Seward airship, kite balloon, and seaplane station.......	2,449,168
Pearl Harbor airship, kite balloon, and seaplane station..	3,250,000
Hilo seaplane and kite balloon station	975,500
Port Apra airship, kite balloon, and seaplane station.......	2,726,500
Cavite kite balloon and seaplane station	3,250,000
Total..................	$19,967,168
Atlantic and Gulf coasts and Caribbean Sea	$26,980,000
Pacific coast, Alaska, and Pacific Islands	19,967,168
Total..................	$46,947,168

Two hundred dollars an acre for land is thought to be a good average figure, although in some localities land can be purchased for $5 an acre, while in other localities as high a price as $900 an acre may be asked. It is strongly recommended that the necessary land be purchased for the establishment of each of the stations recommended by the General Board. A dirigible station will require approximately 640 acres, and a 24 large seaplane station will require approximately 50 acres. A 12-seaplane station will require 30 acres. The reason for omitting an estimated cost of construction of a rest and refueling station is due to the fact that no definite plan has been adopted as to what a rest and refueling station should consist of. It is to consist only of gasoline, oil, and water storage facilities, connecting road and telephone connection. $5,000 seems to be a satisfactorily estimated cost.

MR. KELLEY: How much money have you had during the last fiscal year for aviation?

CAPT. STEELE: $220,383.119 appropriated, sir.

MR. KELLEY: Is there any balance on hand?

CAPT. STEELE: At the end of the fiscal year there will be a balance of approximately $90,000,000.

MR. KELLEY: We have a large number of stations abroad yet in operation, I suppose, Captain?

CAPT. STEELE: The stations abroad have ceased operations, sir.

MR. HICKS: Can not these machines be brought back and used in some of these contemplated stations in this country?

CAPT. STEELE: They would be, sir, but the cubic ton value of those machines will not warrant bringing them back.

MR. HICKS: What do you propose doing with them?

CAPT. STEELE: They expect to sell what they can over there, which will probably be very few, and the rest of them they will knock down and send back the fittings and the engines, which are the most valuable parts of them.

The total number of machines sent abroad is as follows:

Twin-engine seaplanes, 159.
Single-engine seaplanes, 229.
Service airplanes for land use, 140.

MR. KELLEY: What is the cost of these large patrol boats and those you estimated?

CAPT. STEELE: The large patrol boat costs $24,000.

MR. KELLEY: So that the item of large patrol boats would not be an expensive item?

CAPT. STEELE: We are asking for only 54 of these until a year from next July.

MR. KELLEY: Can you put in the record a statement of the number of machines of all types in the service at the present time?

CAPT. STEELE: Yes, sir.

(The statement referred to is as follows):

Twin-engined service seaplanes......	34
Single-engined service seaplanes.....	337
Airplanes for land use (marines, training)	100
Training seaplanes	401
Experimental seaplanes	12
Total.........................	884

In addition to the above there have been shipped abroad the following:

Twin-engined seaplanes	159
Single-engined seaplanes	229
Service airplanes for land use.......	140
Total.........................	528

MR. KELLEY: With regard to these kite balloons, 560 kite balloons, do you think you will need that many?

CAPT. STEELE: Regarding any order of kite balloons for one year, it is necessary to take into consideration the fact that the life of a kite balloon averages about three months. Five hundred and sixty balloons, therefore, means 140 that are actually kept in operation throughout the year. The General Board's program calls for 136 kite balloons for use on shore stations alone. The estimate, therefore, allows for only a slight excess in the requirements for shore stations and makes no allowance for requirements of the fleet. The estimate is thought to be sufficient, however, as some of the stations will not operate at full capacity during the entire year.

MR. BROWNING: How many kite balloons have we now? Have we any of them?

Kite balloons now on hand...........	76
The remaining kite balloons of the 282 delivered have been disposed of as follows:	
War Department	64
Shipped overseas	42
British	100
	282

MR. KELLEY: I notice you have a request, Admiral, for four rigid dirigibles, at $1,500,000—that is $6,000,000—and 12 nonrigid dirigibles, at $250,000; that is $9,000,000 for dirigibles alone. Did the dirigibles figure much in this war?

CAPT. STEELE: Yes, sir. It is quite probable that the dirigibles saved the German fleet at the Battle of Jutland. I think that lighter-than-air craft will assume a very important position in aerial navigation; and other nations are going ahead on them very much more rapidly than is proposed in this estimate.

ADMIRAL TAYLOR: The question of the development of the lighter-than-air craft, Mr. Chairman, is a question of policy, as to whether we are to go into the general type of the Zeppelin, which, as I understand, has been passed on by the General Board, and they think that it should be developed in time of peace; that it should be a very important part of the Navy. We have had very little lighter-than-air development so far, but if it is going to be a permanent part of the Navy, to start with four is a comparatively small development—it is virtually experimental. The Zeppelin is an expensive thing; there is no doubt about that. It is not only the cost of the Zeppelin itself, but you must have large hangars to take care of it. The incidental expenses are large; you must have a properly developed field to work it in; you must have a hydrogen generating plant.

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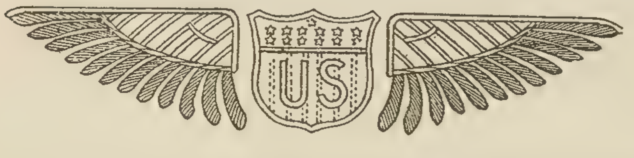

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Personals

Cols. Archie Miller, Milton F. Davis, William E. Gillmore and Henry C. Pratt, and Lieut.-Cols. Rush B. Lincoln, Benjamin F. Castle, Millard F. Harmon, Jr., and Harold Benington have been appointed a Board of Officers of the Air Service, Division of Military Aeronautics, to consider matters affecting the personnel.

Christmas cheer was brought to the wounded soldiers at Walter Reed Hospital, Washington, D. C., through the special efforts of Mrs. E. R. Boughton, of the Finance Branch, Division of Military Aeronautics. Cash donations amounting to $210.68 were made by officers and war workers, and with this fund the hearts of some sixty men were made glad on Christmas morning by many practical gifts.

Col. Clinton G. Edgar, Chief of the Supply Section, D. M. A., Washington, D. C., who is on a leave of absence, is reported to be confined to his home in Detroit, Mich., with illness.

Assistant Secretary of War Edward R. Stettinius, who has been abroad on a special mission of unifying shipments of allied war supplies, returned to Washington this week to make a report to the War Department. Secretary Stettinius had been absent from the United States since last July. He plans to return to Europe about Jan. 15.

Col. Alexander L. Dade, who was formerly identified with the Air Service as Chief of the Air Division, Signal Corps, and in other capacities, was recently sent on a special detail to Fort Leavenworth to investigate matters affecting conscientious objectors.

Major Gen. W. L. Kenly, Chief of the Division of Military Aeronautics, and Col. F. R. Kenney, Chief of the Executive Section, D. M. A., left Washington this week for a trip to Omaha, Neb. They are making the trip partly by train and partly by airplane, the first leg of the journey being to Memphis, Tenn., by train, and thence to their destination in a DeHaviland 4.

Lieut.-Col. George R. Harrison, A. S., A., is ordered to report to the Acting Chief of the Militia Bureau at Washington, D. C. Lieutenant-Colonel Harrison was Commanding Officer of the United States School of Military Aeronautics, Cornell University, Ithaca, N. Y., which has been discontinued.

Capt. David R. Scott, M. C., is transferred from Payne Field to Souther Field for duty as flight surgeon of the Air Service Flying School.

Major Patrick Frissell has been relieved of the command of Eberts Field, and appointed Commanding Officer of the Aviation Repair Depot, Indianapolis, Ind.

Major Arthur F. Wheat, M. C., is ordered to make a tour of inspection of X-ray laboratories. Included in his itinerary is the Army Balloon School at Fort Omaha.

Capt. Anton R. Rose, S. C., stationed at Carruthers Field, is ordered to the Aviation General Supply Depot and Concentration Camp and Air Service Depot, Garden City, N. Y., and also to the First Provisional Wing, Mineola, for the purpose of conducting nutritional surveys.

Major Joseph N. Barney, M. C., is relieved from duty with the Students' Army Corps units at Washington, D. C., and ordered to the Air Service Depot, Garden City, N. Y., for duty.

Col. Bion J. Arnold, A. S., who was recently ordered from Dayton, Ohio, to Washington, D. C., has been detailed to the Division of Military Aeronautics for duty.

Capts. Herbert E. Ives and E. F. Kingsbury and five first and second lieutenants on duty with the Photographic Section, Bureau of Aircraft Production, have been attached to the Division of Military Aeronautics. The officers are to continue their present duties at their present station.

Second Lieut. Harry Reiss, V. C., has been ordered to Carlstrom Field for duty as camp veterinarian and meat inspector to inspect the meats and meat products received at the cold-storage plant there, and also those issued to or purchased by the troops at Carlstrom and Dorr Fields.

Transport Craster Hall, carrying Major-General Charles T. Menoher, who has been appointed Director of Air Service, and ten officers of the Air Service, sailed from France, Dec. 20.

Thomas A. McGinley has declined appointment as major in the Air Service, Production, and the order of appointment instructing him to report to the Buffalo office of the Bureau of Aircraft Production has been revoked.

Lieut.-Col. Thomas Duncan has been appointed commanding officer of Eberts Field. Lieutenant-Colonel Duncan was in command of Wilbur Wright Field last September when he was called to Washington as Chief of the Operations Section, Division of Military Aeronautics. He succeeded Col. Gerald C. Brant, who was designated as Temorary Assistant Director, but who is now no longer attached to the Division. Following the recent discontinuance of the Operations Section, Lieutenant-Colonel Duncan was detailed to the Training Section, reporting to Col. M. F. Davis.

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Second Lieut. Otto E. Benell, S. C.

Second Lieut. Otto E. Benell, S. C. 135th Aero Squadron, for extraordinary heroism in action near Thiaucourt, France, Sept. 12, 1918. Lieutenant Benell went out on a two-hour counter attack artillery adjustment under adverse weather conditions. Soon after he suffered an accident to his right hand, which made it useless. In spite of this injury, he continued to operate his wireless key with his left hand, directing the fire of the batteries on concentrations behind the enemy lines. Home address: Mrs. Mary Benell (mother), R. F. D. No. 2, P. O. box 111, Fort Collins, Col.

First Lieut. Philip A. Williamson, A. A. M. G. B.

First Lieut. Philip H. Williamson, 1st Anti Aircraft Machine Gun Battalion. For extraordinary heroism in action near Thiaucourt, France, Sept. 10-26, 1918. Displayed extreme coolness and courage while conducting the advance of his company in the sector near Thiaucourt. Visited daily, under heavy shell fire, his gun positions and made daily reconnaissances of the lines. When wounded he refused to be taken to the hospital until he had superintended the removal of his men to a place of safety. Home address, Mrs. F. A. Williamson, mother, Roland Park, Baltimore, Md.

First Lieut. James A. McDevitt, A. S.

First Lieut. James A. McDevitt, Air Service, United States Army. For repeated acts of extraordinary heroism in action near Ruisy, France, Sept. 15 and Oct. 5 and 6, 1918. On Sept. 15, 1918, while performing an important mission Lieutenant McDevitt's balloon was attacked and riddled by an enemy plane firing incendiary bullets. He stuck to his post and gathered valuable information. On Oct. 5 he was again attacked by several planes and the basket was set afire by incendiary bullets. While descending he was fired upon and his parachute was hit many times; he, nevertheless, insisted upon returning to the air. On Oct. 6 he was attacked and his balloon was riddled with bullets. Again, on the same day, he was attacked by several enemy planes; he remained with his balloon until it came down in flames; he then resumed his post in a new balloon. Home address, Mrs. James McDevitt, mother, 1114 Yale Avenue, Cincinnati, Ohio.

First Lieut. Lloyd G. Bowers, A. S.

First Lieut. Lloyd G. Bowers, Air Service, United States Army. For repeated acts of extraordinary heroism in action near Gironville and Chatelchesery, France, Aug. 14-29 and Oct. 27, 1918. On Aug. 14 this officer's balloon was attacked by four enemy chase machines and, though urged to jump, he remained at his post and secured information of great value. On Aug. 29 he was attacked by enemy planes using incendiary bullets, but would not leave his post before his balloon caught fire; he insisted at once upon reascending, although he knew that the enemy was constantly patrolling the air. On Oct. 27, near Chatelchesery, while regulating artillery fire, he was attacked by several enemy planes and his balloon was perforated by incendiary bullets. He remained in the air and carried out his observation. His extreme courage and devotion to duty furnished a splendid example to the officers and men of his command. Home address G. M. Bowers, father, 1140 South Thirteenth Street, Birmingham, Ala.

First Lieut. W. J. R. Taylor, A. S.

First Lieut. W. J. R. Taylor, Air Service, United States Army. For repeated acts of extraordinary heroism in action near Malancourt and Montfaucon, France, Sept. 26-Oct. 10, 1918. On Sept. 26, while conducting an important observation, Lieutenant Taylor was twice attacked by enemy planes. He would not jump from his balloon because of the valuable work he was doing for the Infantry, although he was at all times in danger of losing his life from incendiary bullets. On Oct. 3, near Montfaucon, Lieutenant Taylor was attacked, but refused to leave until his balloon caught fire. Again, on Oct. 6, he was attacked and forced down in his parachute. On Oct. 10, while he was conducting an important observation, an enemy patrol hovered over his balloon; he refused to jump until attacked at close quarters. His heroic devotion to duty was an inspiration to the officers and men of his company. Home address, W. R. Taylor, father, 13 Prince Street, Rochester, N. Y.

First Lieut. Paul N. A. Rooney, A. S.

First Lieut. Paul N. A. Rooney, Air Service, United States Army. For repeated acts of extraordinary heroism in action near Anstauville and Germonville, France, July 22 and Sept. 26, 1918. On July 22, near Anstauville, Lieutenant Rooney, with Lieutenant Ferrenbach, was conducting an important observation. At an altitude of 800 meters he was several times attacked by enemy planes but refused to leave his post until his balloon was set afire, and only then after he had seen that his companion had safely jumped. While descending his parachute was almost hit by the falling balloon. He insisted upon returning to his post, and was in the air again as soon as another balloon could be inflated. On Sept. 26, while adjusting artillery fire, his balloon was attacked by three enemy planes (Fokker type). At imminent peril to his life he stuck to his post until one plane dived directly at him. Lieutenant Rooney would not leave the basket until his companion, Lieutenant Montgomery, had jumped to safety. Home address, Mrs. W. J. Rooney, mother, 14 Paris Street, East Boston, Mass.

First Lieut. Perry H. Aldrich, Observer, A. S.

First Lieut. Perry H. Aldrich, deceased, Air Service, observer, 135th Aero Squadron. For extraordinary heroism in action near St. Mihiel, France, Oct. 29, 1918. Lieutenant Aldrich, observer, with First Lieut. E. C. Landen, volunteered and went on an important mission for the corps commander without the usual protection. Forced to fly at an altitude of 1,000 meters because of poor visibility, soon after crossing the lines they encountered an enemy rumpler plane and forced it to the ground. On returning they attacked another rumpler and drove it off. After completing their mission and seeing an enemy observation tower on lake Lachaussee, they reentered enemy territory and fired upon it. Immediately attacked by seven enemy planes (Fokker type). A combat followed in which Lieutenant Aldrich was mortally wounded. Next of kin, Rev. Leonard Aldrich, father, Essex Junction, Vt.

Major Lewis H. Brereton, Pilot, A. S.

Major Lewis H. Brereton, pilot, corps observation wing. For extraordinary heroism in action over Thiaucourt, France. Major Brereton, together with an observer, voluntarily and pursuant to a request for special mission, left his airdome, crossed the enemy lines over Lironville, and proceeded to Thiaucourt. In spite of poor visibility, which forced them to fly at a very low altitude, and in spite of intense and accurate anti-aircraft fire they maintained their flight along their course and obtained valuable information. Over Thiaucourt they were suddenly attacked by four enemy monoplane Fokkers. Maneuvering his machine so that his observer could obtain a good field of fire, he entered into combat. His observer's guns becoming jammed, he withdrew until the jam was cleared, when he returned to the combat. His observer then becoming wounded, he coolly made a landing within friendly lines, although followed down by the enemy to within twenty-five meters of the ground. By this act he made himself an inspiration and example to all the members of his command. Home address, Mrs. Lewis H. Brereton, wife, Ontario Apartments, Washington, D. C.

Second Lieut. Walton B. Teneyck, Jr., Pilot, A. S.

Second Lieut. Walton B. Teneyck, Jr., Air Service, pilot, 96th Aero Squadron. For extraordinary heroism in action near Birquenay, France, Oct. 27, 1918. While engaged on a voluntary bombing mission, Lieutenant Teneyck was attacked by seven enemy planes (Fokker type). Although seriously wounded, he maneuvered his plane so skillfully that his observer was able to drive off the enemy planes. In the combat his plane was struck by twenty-five enemy bullets, some of which exploded the magazines of the observer's guns. In spite of his wounds and the damage to his machine he succeeded in landing safely on a strange field. Home address, Walton B. Teneyck, father, 91 Rodney Street, Brooklyn, N. Y.

First Lieut. Ora R. McMurry, A. S.

First Lieut. Ora R. McMurry, American Expeditionary Forces, 49th Aero Squadron. For extraordinary heroism in action near Romagne, France, Oct. 4, 1918. Lieutenant McMurry was a member of a patrol of seven machines which attacked seventeen enemy Fokkers. After shooting down one of the enemy, this officer returned to the fight and shot down another. Home address, Mrs. J. C. McMurry, mother, Evansville, Wis.

First Lieut. Lewis C. Plush, A. S.

First Lieut. Lewis C. Plush, Air Service, 49th Aero Squadron. For extraordinary heroism in action near Romagne, France, Oct. 4, 1918. Lieutenant Plush was a member of a patrol of seven machines which attacked seventeen enemy Fokkers. After shooting down one of the enemy, this officer returned to the fight and shot down another. Home address, William Plush, father, 440 East Phillips Boulevard, Pomona, Cal.

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FLYING FIELDS AND GROUND SCHOOLS

Kelly Field

Lieut. E. P. Rochester, Summary Court Officer and Censor, has been appointed Staff Salvage Officer, taking the place recently vacated by the transfer of Capt. Willard P. Fuller.

Forty De Haviland bombing planes are expected to arrive at the Flying Department in the near future.

Col. W. E. Gillmore, recently ordered from Kelly Field to duty at the office of the Director of Military Aeronautics, will not return to Kelly Field, according to recent advices.

Colonel Gillmore has been placed on the Peace Plans Organization Board of the Air Service, and these duties will keep him in Washington.

First Lieut. Christian H. W. Luecke, commanding officer of the 144th Aero Squadron, has been relieved of his duties at Kelly Field and has been ordered to report to the Director of Military Aeronautics at Washington, D. C.

The Third Wing of the Concentration Brigade has been merged into the Second Wing and officers who were on duty with the organization have been assigned to the Second Wing and other divisions of the brigade.

A course of vocational reading has been planned by the American Library Association for soldiers of Kelly Field who wish to equip themselves for the return to civil life.

Lieut. S. B. Jacobson, amusement officer, who has been away on leave of absence, has returned to Kelly Field.

Post Field

Capt. H. T. Scott has taken up the duties of liaison officer between the factories and the fields in the matter of Liberty engines. He was last stationed at Indianapolis.

What is believed to be at least an American record for length of continuous service has been made by Hispano-Suiza motor No. 3626, which was taken out of commission after completing 500 hours in the air. The motor was in practically perfect condition, with the exception of one bearing, the babbitting of which had worn enough to allow oil to escape, thereby lowering the oil pressure. After minor repairs the motor could again be put in commission. This is the first time this motor has been taken out of the plane since its original installation.

Squadron A won the football championship of the Fort Sill Reservation from the 14th Field Artilery on Thanksgiving afternoon by a score of 6 to 0.

First Lieut. G. J. Higgins has been appointed athletic officer of Post Feld.

Maurice Dyer, of the Metropolitan Opera Company, gave a recital at the Officers' Y. M. C. A., Friday evening, Dec. 13.

Taylor Field

The swimming pool at Taylor Field was used for the first time on Dec. 17.

Captain Wiederkehr has issued an order whereby half the men at the field were given liberty for the period between Dec. 21 and Dec. 27. The other half of the command will have permission to be absent from Dec. 27 until Jan. 2. In this manner the burden of guard will be divided equally and every man will have an opportunity to visit his home.

Scott Field

Capt. Stephen Harder, in charge of the Quartermaster Department at Scott Field, is suffering from a severe cold and has been confined at his home.

According to recent announcement a school is soon to be opened for noncommissioned officers. The course will cover airplanes, rigging and motors. Lieutenant Shannon has been given charge of the classes in paper work and infantry drill, and Lieutenant Spencer in charge of the motors and rigging class.

Lieuts. Kenneth M. Murray and S. J. Machey have received their discharges and left for Chicago.

Captain Etheridge has returned to the post from Detroit, where he had been taking a special course in Liberty engines.

Ellington Field

The Post Exchange restaurant closed permanently on Dec. 21. This step was necessary in order to properly carry out Government orders relative to liquidating the assets of all post exchanges.

Non-flying officers taking the R. M. A. course are to be given a course of study at the field which will embrace 12 hours' lecture on airplanes, rigging, inspection and repair.

March Field

Major F. B. Longley, who is in charge of the engineering department, has returned to March Field after an absence of about a month in Detroit, where he was on temporary duty with the testing and experimental laboratory of the Aircraft Production Department.

Major L. P. Stewart has reported at March Field and assumed his duties as quartermaster of the post. Major Stewart comes to March Field from Camp Cody.

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PHILADELPHIA, PA.

Chart Airmen Run into Snow

The first of the three airplanes flying from Houston, Tex., to Detroit, Mich., to map out aerial mail routes, arrived at Indianapolis, Ind., Dec. 27, from Belleville, Ill.

Lieut. D. M. Jones and Lieutenant Hill left Belleville at a quarter past one P. M. and made the 230 miles in two hours, being compelled to fly very low because of the snowstorms encountered nearly a the way. Lieutenant Jones said the were unable to find the aviation field a the Speedway at Indianapolis in th dusk and landed instead at the Stat Fair Grounds, later taking their "ship over to the Speedway when they had l cated it by telephone.

They will await the arrival of th other two airplanes before starting th next leg of their journey to Dayton, O Lieutenant Jones said. The airplane ca rying Lieuts. Lawson Henry and J. Wagener also started, but soon turne back because of the snowstorm.

The United Aircraft Engineering Corporation

52 Vanderbilt Avenue New York City

CLASSIFIED ADVERTISEMENTS

Rates, 25 cents per agate line per insertion. Black face type, 50 cents per agate line. Every advertisement will be repeated free of charge in *Aviation and Aeronautical Engineering.* Forms close Saturday preceding date of publication.

COMMERCIAL AERONAUTICS—Aviator with experience in Army administration and in former civil life a sales manager and executive desires opportunity of getting into commercial aeronautics in a position where initiative, resourcefulness and ability to construct for the future are essential. Address Box 204.

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Has flown more than forty types of m chines and made many long distance and e durance flights.

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For over four months the special postal planes designed and built by the Standard Aircraft Corporation have carried the air mail between New York and Washington.

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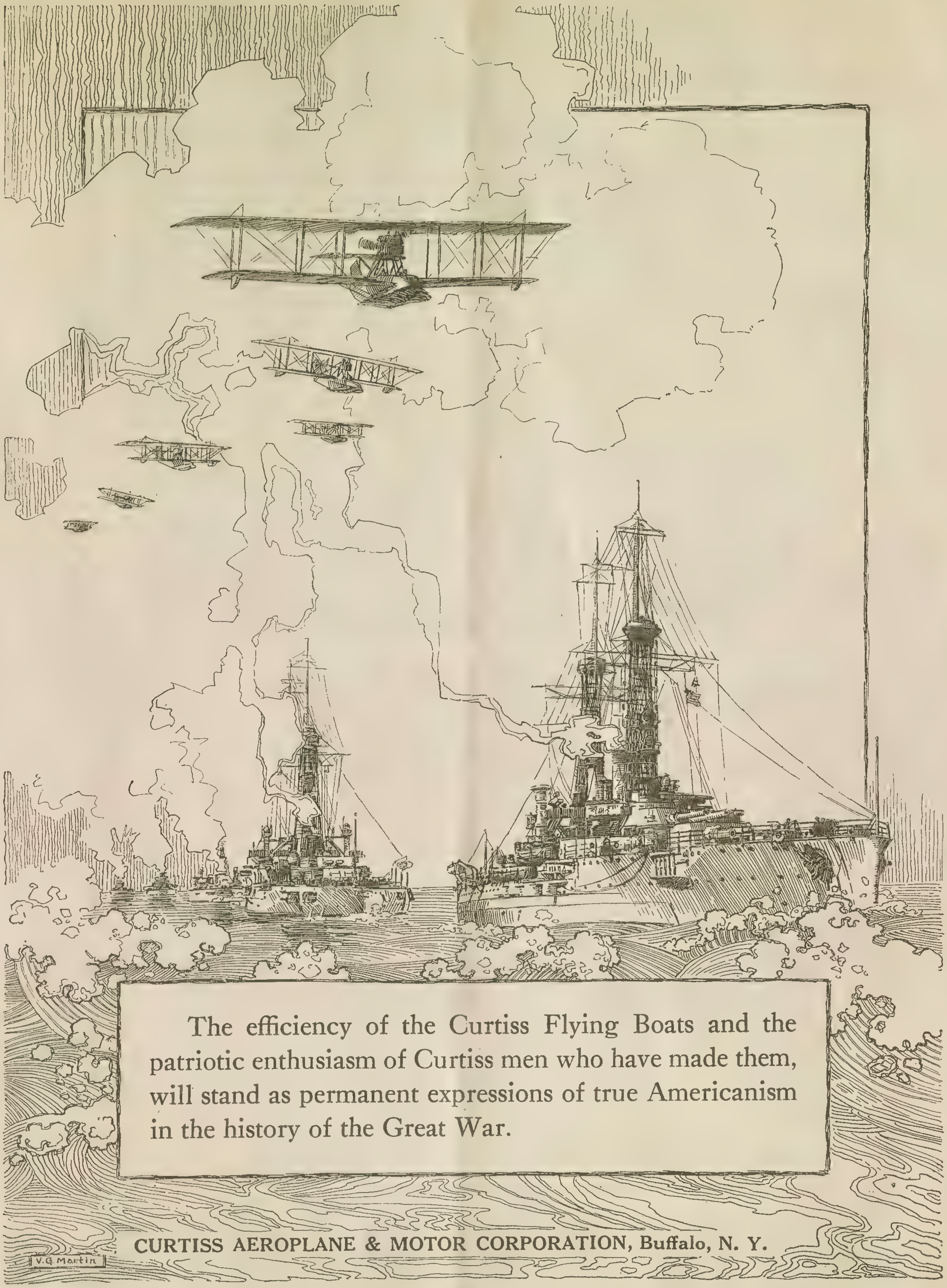
Aircraft Association, Inc.

STANDARD AIRCRAFT CORPORATION
Elizabeth New Jersey



The efficiency of the Curtiss Flying Boats and the patriotic enthusiasm of Curtiss men who have made them, will stand as permanent expressions of true Americanism in the history of the Great War.

CURTISS AEROPLANE & MOTOR CORPORATION, Buffalo, N. Y.

MANUFACTURERS' DINNER NUMBER

AIR SERVICE JOURNAL

The National Aeronautic Newspaper

VOL. IV. No. 2 NEW YORK, JANUARY 11, 1919 PRICE 10 CENTS

SMITHSONIAN INSTITUTION
LANGLEY AERONAUTICAL LIBRARY

United States Should Have a Constructive Airplane Program at Once

Brilliant Scene at Waldorf-Astoria on Jan. 7

MANY AIRMEN THERE

Silent Toast Drunk to the Memory of Theodore Roosevelt

Post-prandial speakers at the dinner given by the Manufacturers Aircraft Association at the Hotel Waldorf-Astoria last Tuesday evening sounded one note that rang clear and true above all others —the urgency of a constructive aviation program by the United States Government.

It was a brilliant, animated gathering, with a sprinkling of radiant, exquisitely gowned ladies in the galleries of the banquet room, while on the floor the multicolored uniforms of foreign army, navy and air service officers lent contrast to the khaki uniforms of our own Air Service officers, a large number of whom just returned from service overseas in time to participate in the scene and receive an enthusiastic welcome.

Rarely has the room been more tastefully decorated. In addition to the profusion of flags and lights, large walnut and mahogany propellers met the eye in every direction, and the diners listened to a musical program that ranged from "Aida" to "K-Katy." Toy balloons were freed from the galleries and sent merrily on their way to destruction. The scene was exceptionally lively.

Silent Toast to Theodore Roosevelt

At 9.30 o'clock the chairman, Frank H. Russell, rapped sharply for order and said:

"Gentlemen: I ask you to rise and drink a silent toast to that great American—Theodore Roosevelt."

Instantly every man was on his feet. The room was darkened. A bugler sounded "Taps." Glasses were raised. For a full minute there was no sound except that of the bugle. The incident was of unmistakable sincerity. No person present failed to appreciate its solemnity or impressiveness.

Hero worshippers found abundant outlet for their emotions in the presence of Col. W. A. Bishop, R.A.F., called by the chairman "the American Ace of Aces"; the transcontinental, mapmaking fliers, who left Rockwell Field, San Diego, Cal., on Dec. 4 and who arrived at Mineola Tuesday afternoon; Maj. Albert D. Smith, Major James H. McKee, flight surgeon, and Lieuts. Robert S. Worthington, H. D. McLean, Albert Pyle and John M. Evans; and in Major Gen. Wm. L. Kenly, Director of Military Aeronautics, who, piloted by Major Wm. C. Ocker, A. S., broke the Washington-New York record by making the distance of 250 miles in one hour and thirty-nine minutes. The flight was made in a specially designed DH-4, equipped with a 400-hp. Liberty engine.

Others who made the flight were: Capt. Roy N. Francis, piloting a new Glenn L. Martin bomber, with two Liberty engines and carrying as passengers Lieut. Col. Claude K. Rhinehardt, Major W. H. Frank, Lieut. R. F. Behan and Colonel Archie Miller, all of the Air Service.

While assembling for the dinner the guests had an opportunity of viewing in the Astor ballroom three brand new airplanes of exceptional interest. One was a Standard M. Defense biplane, the second a Thomas-Morse type S4-E, and the third a Curtiss triplane, type 18, powered with a Curtiss model K, 12-cylinder, 400-hp. engine, built for the navy, with a speed of 160 miles per hour with a full military load, and a climb of 12,500 feet in ten minutes. The machines were greatly admired.

The 800 guests were slow in taking their seats and, owing to the lateness of the hour, were denied the privilege of hearing one of the principal speakers, General Kenly.

He Who Hesitates—

Dominant Note at the Aircraft Dinner

ACTION NECESSARY

Prominent Speakers Point Out Danger of Delay

At the Speakers' Table were:

Frank H. Russell
President Manufacturers' Aircraft Association, Inc.

Major General W. L. Kenly
Chief of the Division of Military Aeronautics

Charles F. Kettering
President of Society of Automotive Engineers

Major H. Dourif
French Aviation Mission

Hon. H. Snowden Marshall
Former U. S. District Attorney

Captain N. E. Irwin, U. S. N.
Director Naval Aviation Division

Hon. W. C. Potter
Ass't Director of Aircraft Production

Henry A. Wise Wood
Vice-President Aero Club of America

Dr. S. W. Stratton
Secretary of Bureau of Standards.

Hon. Grosvenor B. Clarkson
Director of Council of National Defense

Benjamin S. Foss
Secretary Manufacturers' Aircraft Ass'n, Inc.

Rear Admiral Wm. S. Smith
Attached to Naval Consulting Board

Hon. John D. Ryan

Brig.-Gen. J. D. Cormack, R. A. F.
British War Mission

Rev. Nehemiah Boynton, D.D.

Colonel J. A. Mars
Director of Aircraft Production

(*Continued on page 5*)

Photo Doucker & Co.

View of the Manufacturers' Aircraft Association Dinner, Waldorf-Astoria Hotel, January 7, 1919

AIR SERVICE
JOURNAL

JANUARY 11, 1919 VOL. IV. NO. 2

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BILL FOR A COMMITTEE ON AERONAUTICS

Resolution Offered by Representative Norman J. Gould

INTRODUCED ON JANUARY 3

To Consist of Twenty-One Members—The Measure Is Referred to the Committee on Rules

A Committee on Aeronautics is to be added to the list of committees of the United States House of Representatives, according to a resolution introduced by Representative Norman J. Gould of New York on Jan. 3.

This resolution (No. 490) would amend the Rules of the House for that purpose. The committee is to consist of twenty-one members.

The resolution was referred to the Committee on Rules.

The necessity for such a committee in both branches of Congress has been pointed out in recent issues of the AIR SERVICE JOURNAL.

Uncle Sam May Aid Aeronautics

Promotion of aeronautical knowledge by means of educational institutions of the country is contemplated in a bill (S. J. Res. 205), which would authorize the Secretary of War to loan aircraft engines and aircraft material for experimental work by students. It was introduced by Senator Harry S. New of Indiana on Dec. 30. The text of the bill follows:

"That the Secretary of War is hereby authorized and empowered, for the purpose of aiding, fostering, and promoting educational experimentation work, to loan to bona fide educational institutions in the United States aircraft motors and aircraft equipment in such instances as in the judgment of the Secretary of War beneficial educational purposes can be served by such loan.

"Sec. 2. That the title to said aircraft motors and aircraft material shall be and remain in and with the Government of the United States, and the Secretary of War is further authorized and empowered to withdraw such aircraft motors and aircraft material from the educational institutions when in his judgment such action would promote the best interests of the United States Government."

(C) *Harris & Ewing*

Hon. Norman Judd Gould

Who Introduced the Bill in the House of Representatives for an Aeronautic Committee

Norman Judd Gould, Republican, of Seneca Falls, Seneca County, N. Y., born at Seneca Falls, N. Y., March 15, 1877; elected to the Sixty-fourth Congress, and re-elected to the Sixty-fifth Congress.

American Flying in France Recognized

On the day of the signing of the armistice a memorandum of credit and recognition for flying at the 7th A. I. C. Clermont-Ferrand during the period of Nov. 6-9, was made by W. G. Kilner, Chief of Training, Air Service, A. E. F., France. Following is an excerpt:

"The Commanding Officer, John C. McDonnell, Major, A. S.; the O. I. C. Training, John L. Glover, Captain, A. S.; the O. I. C. Engineering, George Hill, Captain, A. S.; the Instruction Staff and Headquarter's Staff and all enlisted personnel.

(1) Number of flying hours (average) per day, 165.42. (2) Total number of airplanes, 118. (3) Number of airplanes in commission (average) per day, 71. (4) Average number hours flown per plane in commission per day, 2.19. (5) Average number hours flown per plane in and out commission per day, 1.23.

Wilbur Wright Statue Plans

A despatch from Lemans, France, says: A sketch of the plans of the Wilbur Wright statue show it to be a fine conception and in keeping with the highest traditions of French art.

The sculpture will be by Paul Landowski, winner of the Prix de Rome, who made the great reformation memorial in Geneva. He is a sergeant of engineers and winner of the *Croix de Guerre.*

The statue will stand on a broad base from the center of which will rear a gigantic pinnacled rock symbolizing the summits of the earth. On the top will be the figure of a man striving to climb higher. Facing this will be a representation of the inventor of the modern airplane. Inscribed on the monument will be a quotation from Victor Hugo, of which a free translation is:

"I have wings and I dare aspire. My flight is sure, I have wings to brave the tempest and penetrate the sky." The statue will stand in the shadow of the great cathedral, linking early history with Wright's epoch.

Creating a War Sales Commission

Creation of a War Sales Commission is provided for in a bill (H. R. 13587), introduced in the House by Congressman Martin B. Madden of Illinois on Jan. 2.

The commission would consist of five members, to be appointed by the President and confirmed by the Senate, each of whom would receive a salary of $10,000 per annum, and having its principal office in Washington.

Among the duties of the commission would be to appraise and sell all personal property and supplies of the Government acquired for, but not now needed for the prosecution of the war by any branch of the naval or military establishment, or other United States agency, which are to prepare inventories at cost price of the articles.

Sales are to be by competition, either public or private, at not less than the appraised values, except that there may be reappraisals in the case of no sales being made at the original appraisal.

ALTITUDE RECORD IS 30,500 FEET

Established by Captain Lang, American, at Ipswich, England

OIL SUPPLY EXHAUSTED

Both the Pilot and the Observer, Lieutenant Blowers, Frostbitten, Are Now in a Hospital

Flying a British airplane at Ipswich Jan. 2, Captain Lang, an American, established a new altitude record, reaching a height of 30,500 feet.

Lieut. Blowers was the observer. Their motor stopped at that height, due to exhaustion of their oil supply, but they landed safely.

Both Lang and Blowers are in the hospital with frozen hands and feet. The latter fainted at 20,000 feet when the pipe through which he was breathing oxygen from a specially designed apparatus became disconnected. He did not recover consciousness until the landing was made.

Captain Lang has been placed under arrest by the British army authorities, according to the London *Evening News.* The captain was arrested, it is stated, because of his disclosing without authorization the details of his climb.

Captain R. W. Schroeder, A.S., at the Wilbur Wright Aviation Field, held the altitude record just broken by Captain Lang. He reached an altitude of 28,900 feet on Sept. 18, 1918, coming down near Canton, Ohio.

Prior to this Heinrich Oelerich, a German, held the altitude record on July 14, 1914, Oelerich reached a height of 26,246 feet. The next highest flight on record was that of H. G. Hawker, an English aviator, who reached an altitude of 23,622 feet on April 26, 1916.

RADIO FLASHES

Seven giant Gothas, the German airplanes made famous, or the reverse, by the dropping of bombs on Paris and London, and the first to be surrendered under the terms of the armistice, were delivered at Coblenz, Dec. 29, to General William Mitchell, chief of the American Air Service. Eight more Gothas are to be turned over to the Americans. The remainder will eventually be delivered to the French and the British.

Thirty-six freight cars, loaded with sixty-seven brand-new Fokkers and a number of Roland machines, arrived at Coblenz Dec. 29. Thirty of the Fokkers are of the newest combat type, unknown at the front when the armistice was signed.

The demonstrations in Berlin Monday, Dec. 30, were the biggest since the beginning of the revoution. One of the features of the affair was the patrol of airplanes over the city, some flying so low that the fanning of the air set in motion by the propellers could be felt in the streets.

The crowds were aware that the planes had been placed in service on the occasion for police work and that they would unite with such force in volume and character as might be necessary to break up any attempts to effect a coup d'etat in the prevailing confusion and excitement.

Lieut. John P. Roullet, A.S., with 155 men from Brindley Field performed valient work in rescuing soldiers from the stranded Northern Pacific off Fire Island, Dec. 2. Lieut. Roullet especially distinguished himself, jumping into the surging sea and rescuing two men from an overturned boat.

Cooties cost the lives of a million men in the war zone. They are held responsible for trench and typhus fevers.

SNAP SHOTS FROM ALOFT

Theodore Roosevelt died the first American of his day, and he died at a time when the United States needed him as we have never needed him before.

"As clean as a hound's tooth," he represented the ideals of America as no other man has since Abraham Lincoln. In statesmanship, in politics, in business morality his touch was vital.

Faithful to friends, generous to enemies, a fighter of the type that commands not only admiration but enthusiasm, his life was so full of activity and incident it is small wonder every American today grieves beyond expression in words.

He trusted America and America trusted him.

The debt aviation owes to Colonel Roosevelt is known to but few of the present generation of aeronautical workers. In the earliest days of heavier than air experimentation in this country, when Professor Langley was struggling to secure funds to carry on his research work, the Assistant Secretary of the Navy, Mr. Roosevelt, assisted in securing from Congress the appropriation necessary for these valuable experiments.

Later, when the Wrights were making their first trials, Colonel Roosevelt, then President, saw a notice of their flights in a scientific magazine and ordered that the new machine be secured for government use. It is therefore due to Theodore Rosevelt that the United States secured the first government owned airplane ever flown. From then until his death he was intensely interested in aeronautics. His pride in the achievements of his son Quentin and the fine example he set for bereaved parents is still remembered by the whole country.

In the passing of Colonel Roosevelt, aviation has lost one of its earliest and one of its truest friends.

An aircraft exposition under the auspices and management of the aircraft manufacturers themselves, with the cooperation of the Department of Military Aeronautics and of the Bureau of Naval Aviation, will be held in Madison Square Garden, New York City, February 27th to March 6th.

Such an exhibition at this time will go a long way toward enlightening the public as to the part America has played and was preparing to play in the "war in the clouds" and the amazing advance which has been made in the aircraft art during the great conflict. Furthermore, during the war manufacturers, engineers and others interested in the practical aspect of aeronautics, because of concentration upon their own work, and the censorship, have had little opportunity to follow the progress of the industry as a whole. A show now will give them this opportunity and clear the way for new types and improvements in existing types.

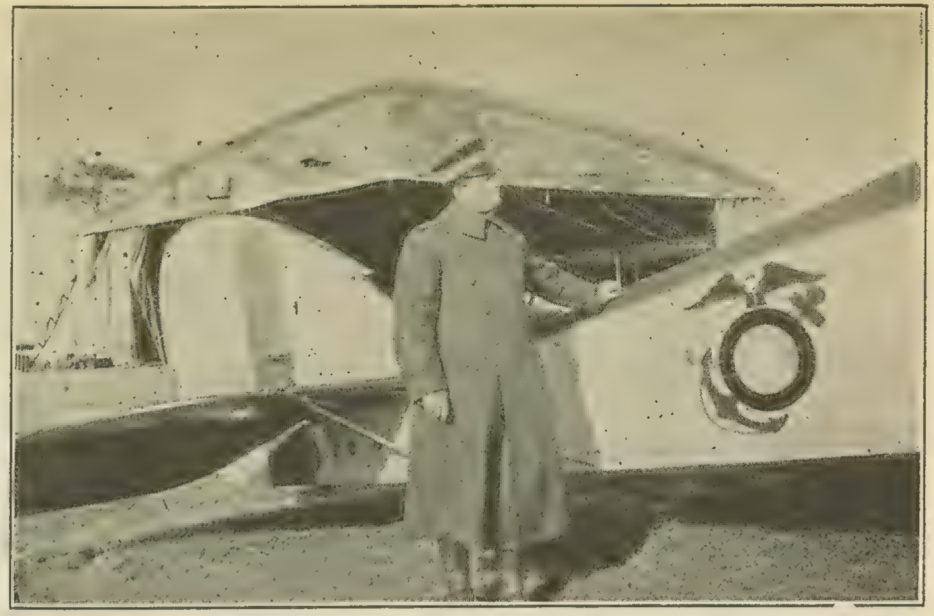
No doubt all the airplane constructors who are bringing out postal and commercial airplanes will take advantage of an exhibition to show their machines. The special point in having the show immediately would be to take advantage of the exceptional popular interest and curiosity in aircraft which the war has excited.

Cooperation of the Government might well take the form of making part of the show a complete official exhibit of war planes, armament, anti-aircraft batteries and all auxiliaries of offensive and defensive aerial tactics. England, France and Italy might well arrange to show their latest machines; and to have some of the famous American and foreign aces present with the fighting craft would be an undeniable attraction.

73,500 Men to Go from Air Service

According to a statement made by the Chief of Staff on Jan. 4, 1,004,000 men have been designated for discharge from the Army in the United States. Of this number 40,000 men are in the Division of Military Aeronautics, 30,000 in Spruce Production, and 3,500 in the Bureau of Aircraft Production.

General March placed the total number of men available for discharge at 1,379,000, and the number of men who were discharged up to and including Dec. 28 at 592,245. It was estimated that the number discharged during the week ended Jan. 4 would be 38,124.



Major A. A. Cunningham

Commandant of the Aviation Section, U. S. Marine Corps

Accompanied by three squadrons of the foreign unit, Major A. A. Cunningham, Commandant of the Aviation Section, United States Marine Corps, arrived in this country from France recently. The unit comprised 150 officers and 880 men, of whom 115 officers and 700 men returned with their commanding officer, and of whom 35 officers and 180 men, composing the fourth squadron, came over two weeks previously.

The total strength of this Section is 2347, of whom 364 are officers; 112 student officers, and 1871 enlisted men. A little less than 50 per cent, therefore, saw active service at the front.

It is recorded that prior to the year 1912, the Marine Corps had no flying personnel and that Major Cunningham was then appointed the first aviation officer. He was the entire Section, but in the six years which have since elapsed he has seen it grow into a comparatively large and decidedly splendid organization of picked and well-trained air fighters. Their efficiency, which is very largely due to his enthusiasm and efforts, and the application of stringent methods of training, learned during a trip to England and France in 1917, has been highly commended by the Major General Commandant.

Speaking of his flying corps, Major Cunningham says that the men, who went over, had been trained for a year and a half and were picked from hundreds of good men. "They jumped into the thickest of the battle," he continued, "and stayed right with the best and oldest of the Allied fliers."

In France they were known as "The Day Bombing Wing." They had their first fighting experience during an offensive in Belgium when the air was filled with fog and rain, when every condition for aerial operations was unfavorable, and when their most distant objective was seventy-five miles into German territory. Though in France only four months, their activities continued up to the very day of the signing of the armistice and when the history of their deeds is written, it will contain many a story of individual bravery and daring. The Corps' total losses were eight officers and forty men.

Major Cunningham is the originator of the special insignia, which was adopted for use on all planes of the Marine Flying Corps as a means of identification and a certain element of protection against infringement. This insignia is a combination of the emblem of the Marine Corps and of the Allied airplane marking. Major Cunningham is shown in the illustration standing beside one of the marked bombing machines outside of a hangar in France.

Major Cunningham will be attached temporarily to the headquarters of the Marine Aviation Section.

Freight by Airplane, Says Fairfax Nolte

Transportation of freight by airplanes was discussed by Fairfax Nolte, an airplane designer, at a meeting of the Empire State Association in Washington, D. C., on Dec. 31.

Mr. Nolte said there is no limit to the possibilities of aerial service. Men who had given the subject close study had decided long ago that all obstacles to the successful crossing of the Atlantic would soon be removed and he believed a regular passenger line would be established between the American and European coasts within a year.

"I know when I say freight will ultimately be carried through the air more cheaply than through the barge canal or over the surface railways I am making a statement which may be challenged," said Mr. Nolte. "But the thing to me is very simple. There are two elements which must be taken into consideration. One is that of time and the other speed.

"The airplane which can go 150 miles an hour can certainly carry freight at a less rate per mile than the barge boat which is traveling eight miles an hour. Moreover, there are no tracks to repair, no highways to keep in condition, no waterways to be kept open. In the air you have a clear and unimpeded highway which needs no attention, while on the railways you must keep every foot of the line in condition all the time."

Mr. Nolte said aircraft men were seriously considering the speedy utilization of their machines for freight-carrying purposes and concluded:

"There is nothing of the visionary about this. Get the necessary power and you can carry Union station through the air just as easily as you can carry a single pilot."

Abandonment of Building Projects

Building projects as follows have been ordered abandoned by the Director of Operations in instructions to the Construction Division, War Department:

Florence Field, Fort Omaha—Five barracks of capacity of 200 men each; work shop, additional roads and paths, and electric, water and sewer lines.

Chapman Field, Fla.—Quartermaster supply; aero repair and oil reclamation buildings; photographic laboratory, officers' quarters, hangars, messhalls, and also completion of hospital.

Constructive Air Program Is Needed

(*Continued from page* 1)

Hon. Otto Praeger
Second Ass't Postmaster General

Lieut. Alberto Cantoni
Italian Military Mission for Aeronautics in U. S. A.

Lieut. H. H. Emmons, U. S. N
Chief of Engine Production Department, Bureau of Aircraft Production

Major William A. Bishop, R. A. F., D. S. O., V. C.

Harry Bowers Mingle
Treas. Manufacturers' Aircraft Ass'n, Inc.

Chairman Russell's Foreword

Speaking opened at 10:45, Mr. Frank B. Russell acting as Toastmaster.

The Toastmaster: Gentlemen, this is two kinds of a party; we have had one kind, and I think you will admit that our Committee has done pretty well by you. (Applause and cheers.)

But we do want to get down to business for a little while and to consider the subjects which we have before us tonight, if we can, in as serious a vein as possible, because this is a great big problem, which we have before us. It has got to be treated seriously, and carefully, and as we go out from here tonight, we want to remember not only a good dinner but many good suggestions, many thoughts which will come to us in our work, whether it be in an aircraft factory, or out on the field flying, or among the civilian people whom we are trying to interest in the various branches of aviation.

About two years ago my friend, Harry B. Mingle, had a brain throb. He thought that the half dozen aircraft manufacturers, if they would once get together, would find that each was not such a bad sort of a fellow, and that he was worth knowing better. The result was that the Manufacturers Aircraft Association was formed. It was a little body of men, making up only a half a dozen. With that body, within two months from the time it was formed, the Advisory Board for Aeronautics invited us to Washington to consider the question of preparation for the war which at that time seemed inevitable. We went. The discussion there was, how many airplanes were going to be needed. Somebody thought we would have an army of a million men, and that there ought to be at least an airplane for every thousand men, so that meant a thousand airplanes, and then possibly two in reserve, so if half a dozen companies could make 3,000 airplanes, we would have done our duty, and done it well. We had about 5,500 men at that time building in various parts of the country.

But, with the arrival of the British Mission and a thorough realization of what the problem of fighting in the air meant, the demand grew from 3,000 airplanes to 25,000 airplanes, and our work began. At first we were a bit lonely, but automobile manufacturers throughout the country came to our aid, and, as they came, if they were building airplanes, they were welcomed into our association and for well-nigh two years we worked together, not as companies, not as individual organizations working for profit, but as one concerted unit to produce the airplanes that our country needed. (Applause.)

Our forces grew from the paltry 5,500 men to 175,000 men and women at the time of the armistice.

Were those men and women working industriously? The fall of 1918 found the country supplied with more motors and more airplanes than could be conveyed.

The armistice came and everybody took a long breath, and we had a little meeting and said: "Now let us have a Victory dinner, a celebration for the little that we have done. As we talked about it more, as we went back to our factories and heard of the possible cancellation of contracts, as we realized the number of people who had devoted themselves so faithfully to the service of building planes, we realized that the problem which we had before us had really only just begun. And so we changed the idea of our dinner from a little liberty, victory dinner, to a dinner to which we could invite our friends the Army and our friends the Navy, our friends wherever they may be, who are interested in airplanes and in aeronautics and in the progress of this new art, to come together tonight to confer with us as a council of peace for progress.

Photo by White

W. H. Russell, Toastmaster

With that idea in view our committee had selected tonight a number of speakers whom we believe to have the various points or lines of development most clearly in mind.

To start our evening, I should have said in the beginning that we have a number of regrets—there are quite a number. Among them are those from the Secretary of War, from the Secretary of the Navy, from Dr. Charles Walcott, of Smithsonian Institute, from General George D. Squier, from Colonel Sidney Waldron, from Orville Wright, and last from Pat O'Brien. He is on the way raising money for a trans-Atlantic flight, and we wish him luck.

We have as a very pleasant surprise Colonel Bishop, a man who is already very well known throughout this country. (Applause.)

In 1915 Colonel Bishop was a boy in Toronto, Ontario. He joined the Artillery, went into service, went from there to become an observation officer in the Aircraft Service, was brought down, went back, nobody heard of him for five or six weeks, but when he reported for duty he was a full fledged aviator.

In a matter of three months he had captured the military medal, the D. S. O. and the military cross (Applause), with a record of 47 machines brought down officially, and 23 more reported. (Cheers and applause).

Gentlemen, I want just one Hurrah for the "All American Ace" Colonel Bishop. (Cheers and applause.)

Just before he begins, I am told he went back and got six more. (Applause.)

Colonel Bishop's Speech

Colonel Bishop: Mr. Chairman and gentlemen: You will pardon me for starting to correct something that was said, but calling me the "All American Ace" and giving me 47 machines—I am afraid there might be a misunderstanding, because with 47 machines I shouldn't be the All American Ace. I happen to have 75 officially, the remaining 25 being easy ones, of course, and I am very proud to hear Mr. Russell call me the "All American Ace." I came from Canada, and Canada they tell me is a different country than this—they tell me on the map it is colored differently, but as you come down the border, there is no line except an imaginary one on the map. (Applause.)

Speaking of the future of aviation, one can only say that aviation has been made by this great war. At the beginning of the war it was a dream of the pioneer of fliers that flying machines should help to scout and do other work, and they did at the beginning of the war, but no dreams that those pioneer fliers could possibly have had could ever picture the wonderful development which aviation has had during the past four years.

Each month of the whole course of those four years new improvements and new machines have steadily come to the different fronts, and with those improvements and those new machines, new work has developed for the airplane and instead of, as was at first thought, an airplane would simply do scouting work and the odd bit of looking around here and there, it now takes part in every action in any kind of warfare, and no action is complete without its perfect co-operation.

I feel convinced—and really I have seen airplanes do some extraordinary things—I feel absolutely convinced that the future of aviation is not in warfare: it is in commerce, and I think that the wonderful record the science of flying has had will be equaled and surpassed in the next few years by the development of commercial aviation. The first startling thing will be the trans-Atlantic flight, and as every man here knows, that is not far off—not for one machine, but for many machines.

At the end of another year, I feel quite confident that scores of machines will have crossed the Atlantic. (Applause.)

And a great number of men here tonight will doubtlessly take that trip. This trip will without doubt be done not only in the big machines, but in the small machines. Both of these types have their advantages for commerce. The general idea amongst the outside public seemed sometimes to be that the only machine fit for commercial purposes is the big, many engined machine. This machine undoubtedly has tremendous advantages in carrying weight, in going long distances, and, by reason of its two, three or four engines, it may be more reliable, but the engines which have been turned out of late in your country, in England and France and Italy, have shown us that single engine machines may now be reckoned upon to be absolutely reliable, and that a person flying a machine with one engine, one of the good ones, may rely on that engine not to let him down. (Applause.)

This is undoubtedly the biggest step that flying has taken, because in the past the people were very frightened of flying over bad country, continually worrying, I have done it myself, of landing in corn fields, and like fields, woods and all sorts of things—now with engines that one can rely on, we feel absolutely confident that it will carry you through. The little machine, by which I mean the two, three or four passenger machine, will be cheaper to run, cheaper to handle on the ground and cheaper in every way. It will, of course, not bring the same results, with the one exception of speed, and it will always be the fast machine.

I think that it is an extreme case, but you might compare the big machine as you would compare an ordinary roadster to a bus, and I believe the ordinary machine. I would certainly take it if I were going on a long trip from here to Chicago, preferring the roadster to the bus. The Atlantic will certainly be flown in the course of the next six months by more than one machine of the two, three and four passenger class.

The United States went into this war with a jump in every way, but with an extra jump as regards aviation; it headed with a bang; it seemed to feel that aviation was built for the United States and made for it. The first machine it flew flew in the United States of America. America is very proud of that, and she came when she entered this war in the proper spirit. (Applause.) Not only in the development of machine and their manufacture of machines and engines, but young men of the country took up aviation as fast as they could get in; as we well know, many thousands of them rushed up to Canada and many more over to England, and I can tell you here that we took every one who came, gladly and proudly, and they were welcome. (Applause.)

Just in passing, those men carried on in the same spirit everywhere. In France we had Americans in almost every squadron and every squadron is proud of the record that those Americans made. (Applause.)

Now, your country is full of young, keen, fully developed, wonderfully trained pilots. These people must have employment. They wouldn't want to give up flying either; there is no necessity for it. The future of aviation in the commercial sense will need every one of these men and you are a very lucky country to have such wonderful men trained and eager to fly.

Before I sit down, I would like to speak of one more thing entirely apart from flying, and that is our great friend, with a question mark—the German people.

This war has shown up many things and chief amongst them is what the Hun really is. I don't suppose for a minute it is in the mind of any person present to think that the German has changed a particle, but I want to tell you a few things that have come to my notice and that I can repeat as absolutely authentic.

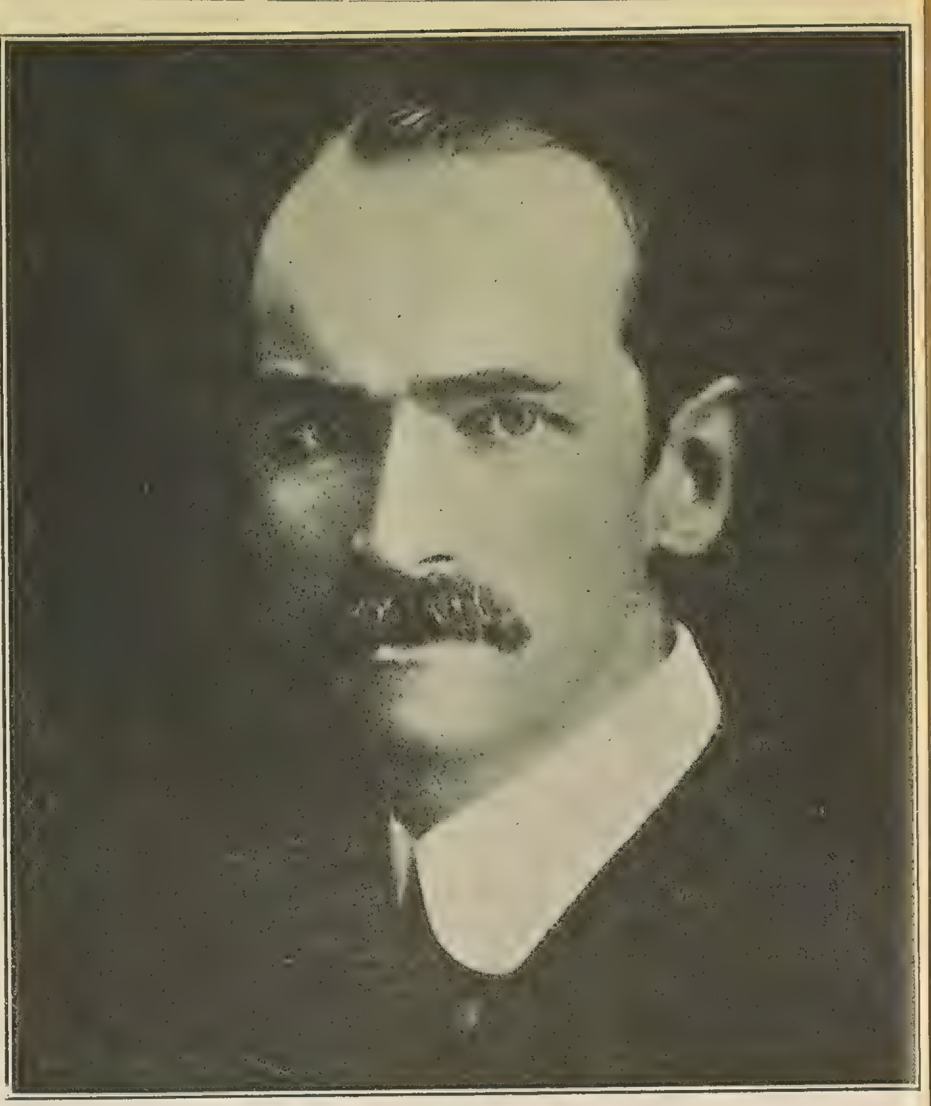
A terrible case, and you will pardon my repeating it, simply because I feel it my duty to pass it on to everyone I see—in the recent German retreat, the atrocities were nearly as bad as those which had taken place in the German advance through Belgium. Major-General David Campbell, the officer commanding the 21st British Division, has it on record that in his field hospital, three or four days before the armistice was signed, a Belgian woman was brought in, found in a dying state in one of the villages that our troops had advanced through. Upon investigation, it was proven that this woman had given birth to a child eight days before, and, gentlemen, it is the most terrible thing to repeat, but three times in the remaining eight days, she had been outraged by German soldiers.

Now, keep that in your minds. To a clean-thinking country, such as yours and mine and all of the Allies, it is something that we absolutely cannot conceive of. I don't think our lowest criminals could do such a thing.

What I want to impress is—it is a well-known fact that the German propaganda is at work. They quit fighting; we beat them; they go down on their knees and plead for mercy; we give it to them; while they take it with one hand, with the other they hand out this dirty propaganda designed to split up those gallant Allies who have fought and died so bravely together. (Applause.)

Now, gentlemen, our men have fought and died shoulder to shoulder, and as brothers together, with the most wonderful feeling of comradeship. I have just come back and throughout England and France, the most wonderful feeling of gratitude and brotherhood exists for the American soldiers and the American people. (Applause.)

And it is up to each one of us in all these countries to fight this propaganda, to watch for it, shove it down at every



Glenn H. Curtiss, President Curtiss Engineering Corp.

chance, and to go through this glorious future peace which we have paid such a glorious sacrifice for, together, shoulder to shoulder, as we have fought and died together. (Cheers and applause.)

(Three cheers were given to Mr. Bishop.)

THE TOASTMASTER: We are glad Colonel Bishop could be with us, and I am also glad that your chairman understated his record, because now we have it right. I want to present to you another sky pilot, a man who gave to the service of the country his three sons, and not stopping at that, gave his son-in-law, two as Chaplains, one as a Lieutenant in the Navy, the other in the Air Service, and then he went off and served himself for a year on this side.

Dr. Boynton's Eloquent Address

REV. NEHEMIAH BOYNTON: Mr. Toastmaster, ladies and gentlemen, it is usually granted that everybody who is interested in aeronautics flies high and moves swiftly, but I question whether anybody interested in this goodly craft has flown higher or moved more swiftly than some of you people have here tonight. (Laughter.) We certainly are in mighty good fellowship, having the privilege of paying our honor and our respect to Colonel Bishop, not as he himself would be the first to declare for the splendid achievements which have been his, but for his position as a representative of thousands of young men, the very flower of our country and of Great Britain as well, who have given their lives in the splendid adventure of the air service, a service which, as has been intimated here tonight, has developed more in these years of war, and has attained for itself a significance with which no other branch of the service can properly be compared, because the other branches of the service were pretty well developed in their ideals and in their possibilities when the war broke out, but the air service was in the very beginning of its career, and the development of that service has been the marvel of the war.

I want to have the honor not only of welcoming the Colonel, but of welcoming all those other splendid flyers who have just come from the other side to find their way into the homeland. (Cheers and applause.) I want to tell them that we are mighty glad they got back again with a whole skin. (Applause.) And that while we have envied them their opportunities and their achievements, the thing which will impress them as they move around their country, now that they have come back to it is this: How many men—and God bless them, how many women—there have been who did not have the hono which is so precious for some of us, o wearing the uniform of our country, bu who still put up a heroism in the servic in their various civic spheres, withou which it would have been absolutely impossible for our soldiers and our sailor and our flyers to have fulfilled successfull and in conquering fashion the tasks t which they have addressed themselves (Applause.) . . .

I call your attention to this one fact that the merchants and the manufacturers of America have been trained so thoroughly in these last years as the soldiers and the sailors, that they have seen visions, that they have dreamed dreams. Just before the war we had to excuse the American business man for the passion with which he chased the almighty dollar, and we made all manner of excuses for him, and the last thing they said was that he had some of the English blood in him, that he was a kind of a sport, and that he was in business not simply to make money, but for the pleasures of the chase. (Laughter.)

Well, the business men of America, during this war, have found a new pleasure in the chase. In the first place they have found how to give, as they never knew before. In the second place, they have found out the worthlessness of money per se, that unless a man can find something to do with his dollars that is really worth while for the sake of the world, it is not worth the time of a decent all-around man to be just piling up the dollars. (Applause.)

I don't know anything about aeronautics, but I am pretty sure of this: That the same thing is going to be true with relation to aeronautics which is to be true in other departments of business. The one thing is absolutely certain, and that is a new industry has come into the world, and a new method of transportation has come into the world through aeronautics which must not be permitted in any way to enter the areas of subtraction, now that the piping days of peace are upon us. (Applause.)

It must be true that as the years come and go this wonderful art which has been developed by these magnificent young men—the history of heroes is always the history of youth, you know—shall be pushed to finer, higher and wider conclusions, not for the sake of the pocketbooks of the people who are pushing it primarily, but for the sake of the welfare of the world.

I congratulate you, therefore, gentlemen, that you are gathered together with these young men who have made use of the products of your skill so efficiently over the sea tonight for the purposes of securing the permanence and the advance of the craft which you are introducing, and I only ask this of you, that, as I know you will, you put yourselves on the same level with all the other merchants and manufacturers of our country who are asking themselves, as never before, the more serious question as to what after all it really means to be in any business which is worth while, and who judge the efficiency and worth-whiledness of their business, whatever it may be, by the manner in which it can be made to minister to this growing ideal of a friendship of the world, which is being built today upon the sacrifices of those who have offered their lives for righteousness and for justice, and beyond that, on the earnest efforts of those who are living not first of all for themselves, but first of all for their country and for their God. (Applause.)

THE TOASTMASTER: I know that every one here is grateful to Dr. Boynton for the inspiration which he has given us, as manufacturers, towards the true aim of all work. He spoke a little while ago about the excitement of the chase.

About a year ago it was awfully exciting and we were being chased. The Aircraft Production Board was being chased. We did not want to hide, we did not want to talk, we just had to sit still and hope that when the right fellow came along, if we were wrong, we would be caught. For that reason, every one in the industry—and I am quite sure everyone in the Aircraft Service in Washington—was more than gratified when our President appointed a committee to investigate the aircraft situation, and when that committee was known, and it was appreciated that it was headed by H. Snowden Marshall, our anxieties ceased, for we knew that we would get a square deal. It is a very great pleasure tonight to have Mr. Marshall with us, because he has grown to know us from possibly more sides and in more ways than is possible in ordinary business association. I take great pleasure in introducing Mr. Marshall. (Applause.)

Snowden Marshall's Address

MR. MARSHALL: Mr. Chairman and gentlemen, on the eleventh day of last November the production of aircraft in this country had gotten under full swing. The whole force of the country had gotten back of it, it was approaching—although it had not yet reached the very top of the speed that it was approximating.

I am told that on that day there were aircraft in this country that could not be shipped abroad, for lack of ships. On that day, in the foot race that was going on between Mr. Ryan and Mr. Schwab, Mr. Ryan had forged ahead almost a lap, and I understand had turned around toward Mr. Schwab and placed his thumb upon the end of his nose and extended his fingers to Mr. Schwab, making a sign, gentlemen, that was classical many years ago. (Laughter.)

Now, because that success had been reached, because everything had gone so well, and because this country was taking a great pride in its manufacture of aircraft, I think perhaps you will be glad to have me dig up the dry bones of the past and tell you how bad it was, or was thought to be, not quite one year ago.

It will be a pleasure, perhaps, to hear about it, because the contrast is so keen and clear, and the success has been so great that the memory of what people used to say about you, about the manufacturers of American aircraft, the memory of the bricks that were slung at you, it is a pleasure now to think of it.

Last March, I would say, was the time when the blackguarding of aircraft manufacturers got its zenith. Every editor who had anything to spatter spattered you. Every fellow who wanted cheap notoriety abused you. The most remarkable men appeared in public places, posing as experts in aircraft manufacture and chucked bricks at you.

Now, the torrent of abuse got so great that this committee was appointed, of which I happened to be a member, and it was thus that I, theretofore entirely innocent of any knowledge of aircraft manufacture, became acquainted in some degree with what was going on at that time.

Well, the first thing I walked into was a fight. There was the most tremendous lot of vituperation going on, the most blasphemous charges of fraud, of treason, of profiteering; there was a sort of a general impression on the part of some newspaper men, at least, that every factory for aircraft was infested with German spies which tore down the work as fast as it was put up. It is now happily forgotten, but that was the state of the public mind at that time.

Photo Underwood & Underwood

J. G. White, President Springfield Aircraft Corp.

To give my first impression of the row that I found going on, I am reminded of the story of an Irishman who was called as a witness to a fight he had been in, and the Judge said: "Who was the first man you saw when you got to the scene of the fight?" He said: "Faith, your Honor, the first man I saw was two brick bats." . . .

Now, I have been asked here, of course, to talk of the past, but I can't help thinking of the future. The problem we have here now is a pretty big one—it isn't as big as the one we had before, and as we solved the last one, I am sure we will be able to solve this one; but here we have aircraft turned out in quantity, talented, skillful manufacturers able to turn aircraft out. It is a certainty, as sure as people can be of anything that they don't know, that the time is near when the production of aircraft will be a most important thing, commercially and in every other way in this country—and we have come to a stop. Are these manufacturers, are these plants to be dismantled? Are we to let this great industry that was born in America leave here again? The only customer, the only present customer, is Uncle Sam. The commercial or other uses of aircraft have not yet developed, but it seems to me it would be an awful pity if we slumped back into the state in which we were before, and left to other countries—left to countries across the water the development of that industry that belongs to the United States by right of discovery. (Applause.)

I got to thinking, while our reverend friend was making his eloquent address, of a sort of comparison between the aircraft industry and the story of the Prodigal Son—reversed. The aircraft industry was a younger son of Uncle Sam; he was younger than the steamboat; he was younger than the telephone, but he was still the son of Uncle Sam and he didn't go into a far country to spend his substance on riotous living, but he went out because his old man wouldn't have anything to do with him, and when he got to that far country he didn't sink to a level where he fed on husks, but everybody in the far country he went to make a lot of him, and he prospered greatly; although his father at home continued to sneer at him and never had a good word to say for him and had never done a good thing for him in his life. And then the time came around when the old man was in a lot of trouble and he wanted that boy back and he said: "Come back, son, and I will give you all the veal you can eat." Now, he came back; he got him back, and he began to feed him on veal, and he found that the boy at a lot of veal, and he found that it took a lot of trouble to teach him to get used to American clothes because he had been dressed in foreign clothes for such a long time; but he finally got things so that the boy was used to being at home and got to feel the way he felt when he went away, and then the time came when the old man really didn't need him any more, and that is the part of the story we have gotten to now.

Is the old fellow going to say: "I am not going to have this chap around me any more because he eats too much," or is he going out into the back yard and going to raise his hand up in the air and say: "I have made a damned fool of myself once about this boy, but now I have got him back, I'll keep him here, if I have to kill every calf I got on the place." (Applause.)

THE TOASTMASTER: Mr. John D. Ryan is here with us tonight. (Applause.) He comes at a considerable sacrifice to himself, because he has just recovered from a cold; but we do want to hear from him, to have a word from him with reference to his work as Director of Aircraft Production. We know how he prepared for that work, quietly; many of us wondered what he was doing all those two or three months before he went abroad, and then when he went abroad we got awfully lonely and wondered if he would not come back. He came back, and as Mr. Marshall said: "Aircraft production and the aircraft program was at its zenith very soon after his return." I have very great pleasure in introducing Mr. Ryan. (Applause.)

Mr. Ryan's Remarks

MR. RYAN: Mr. Toastmaster, Ladies and Gentlemen: Public speaking is not in my line, but I would be a poor sort of a fellow if I couldn't say a word to you men assembled here tonight; I would be a poor fellow if I couldn't say, in appreciation of what you have done for the country, and done for the cause that we have won so gloriously, done for me in the short time that I had to do with aircraft production. Probably no one has come out of the war with as much credit for what somebody else did as I have. (Laughter and applause.)

I was called into the aircraft production at a time, as Mr. Marshall says, when there was a great deal of discussion and a great deal of criticism, and I say to you tonight in all earnestness, most of it was totally and entirely undeserved. (Applause.)

Glenn L. Martin, President of the Glenn L. Martin Co.

Photo Press Ill. Service

Harry Bowers Mingle, President Standard Aircraft Corp.

Photo Underwood & Underwood

Aircraft production had to start at the beginning. It had to find a way from nothing, to meet the demands of the American people, that had been brought to a point that was beyond all reason. People talked of clouds of airplanes, like tens of thousands of sparrows, and it was just as impossible to realize that dream as it was to realize any kind of a dream. Aircraft had to be built slowly, carefully, it had to be built to conserve, first the lives of these gallant boys who took these ships in the air. They had to be made sure; every wrinkle, every crinkle, everything that could be a menace to the life of these boys had to be taken out of them, if it was possible, before they were sent to fight across the line, and they had to fight across the line. The work that was done before me made it comparatively easy for me to win a good deal of praise, as I say, that I was not entitled to. The work of my predecessors, the work of the aircraft manufacturers of the United States, was a thing that when I got into it and studied it was amazing to me in its completeness. and all it lacked was just time enough and just some organization to center it, to drive it in the direction, and to finish it.

The manufacturers of this country, with singular devotion to the country, with great patriotism, and with the greatest earnestness that I have ever seen in any body of men, had built an organization for the manufacture of aircraft that very certainly has never been equalled in the world, in the time in which it has been done. (Applause.)

The brains that were in the aircraft organization at the time that I took charge of it had been well-directed. There were some things that might have been better done. There are things always that might have been better done, but in the main, in the mass, the work was well laid down. It was under way, and the manufacturers of this country who were making aircraft were doing a wonderful job as far back as last May.

I want to say that no association of my life has given me such great pride and such great pleasure as the association with aircraft manufacturers, with the Department of Military Aeronautics, with these boys who took our planes and proved them and flew them and fought them. . . .

I hope that what has been accomplished in aircraft, in war times, will be duplicated to a great extent in peace times. I have not any doubt that there is a great peace future for aircraft. I have not any doubt that the men whose brains, whose money have been put into aircraft will go on developing it, perfecting it, making it so necessary to the life of the world, that the peace requirements in time will exceed the post-war requirements.

I think the peace requirements—and I don't believe I am over optimistic—will in time startle the world. I don't think it is coming today, and I should regret very much if it were pushed too much. I think with care and caution and development, and trial, that the airplane can be made as necessary in peace, almost as it is in war, and I believe it is in good hands. I am out of the aircraft, as you all know. I am back a plain citizen, but I have great interest in it, and its future. I should hate above all to see aircraft, particularly for the defense of the country, go by the board.

I should think that it would be plain to almost anybody that in the necessity for the defense of a great country like ours, with a great coast line like ours, a very extensive aircraft program is a very desirable thing, (Applause.) I think the science of aviation should be encouraged in every possible way. I would have an academy of aviation, just as we have a military academy at West Point, and a Naval Academy at Annapolis. (Applause.) I would educate the boys in this country from the time they are boys, in aviation, strictly and almost exclusively, and I think that with the proper expenditure and the proper direction, that within five years from now an enemy fleet that attempted to reach the shores of the United States would be detected and located so far out at sea that it would be put out of business three or four hundred miles beyond the reach of the shore. (Applause.)

I don't think there is anything in the nature of a dream about that. I don't think that anyone who studies what has been accomplished in aviation, and who thinks what might be accomplished, can consider that at all a dream.

We now have planes that have a long range; we will have planes with a longer range, not necessarily the fastest planes, but planes with a long range that could absolutely detect the presence of a hostile fleet on its way to these shores, at least five or six hundred miles before they could reach us. Not depreciating in any way the great naval defense that we want in this country, and that we must have, I would say the planes could locate the fleet and navy could destroy it. We could be told where it was and destroy it before it could reach us. (Applause.)

I think it is a great pity that the brains in the aircraft organization, naval, as well as in the army, should be scattered. I think that the civilians who have come into this work, able engineers who have gone so far in this work, should be used, should be kept, should teach the younger generation all they know, pass it along, and that these great organizations that have been gotten together under the stress of war should not be dissipated and go back to their civilian employment, and not leave with the country the benefit of all they have learned. (Applause.) . . .

I think that sufficient encouragement and employment can be given to the well-developed aircraft factories of this country, to keep them in the aircraft business, to induce them to make every discovery, to do everything they can to promote the science of aircraft. The organization should be kept intact, the men who are able and who have done this thing, should be kept together as far as possible. It would be a small expense, and God knows, it might be a great measure of economy some day. (Applause.)

It has been a great thing to be identified with the development of aircraft during this war. As little as some of us have had to do with it, it is a thing that we will be proud of to our dying day. To be associated with you men who have done this wonderful work in the building of aircraft, to have served these boys who have carried our craft across the enemy's lines—and they had to go across the enemy's lines because he couldn't come across ours—who have destroyed him—has been a thing that one can hand down to his children with great pride.

I say some people have criticized our work in aviation on the front; some people have said we have been too reckless. People have told me that our boys were too reckless, if anything; the French told me that our boys were too reckless; some of our own good friends have said that our boys were too reckless, but God bless them, that is what won the war—the fact that our boys were too reckless. (Applause.)

I saw them in France, when the clouds were low, and when it wasn't a fit day for anybody to take the air, go out and fly 50 and 60 meters above the ground and bring back a complete record of what was ahead of them. General Pershing told me when I talked with him, on the second day of the battle of the Argonne, that no army ever went out with the information as to what was in front of it as the American army did in St. Mihiel and the Argonne. (Applause.) And these boys that are sitting in front of us and thousands of boys like them went out and got that information.

It is too bad that many of them have never come back, but it is a glory to them, it is a glory to their people, and it is a glory to the country that we have the kind of boys that will do that kind of thing, and it ended the war much before it would have ended otherwise, if we had been conservative and careful.

Lieut. H. H. Emmons, U. S. N.

The Toastmaster: The evening is getting on, and yet there are three or four speakers whom I am very anxious to have you know, even if for a moment. One of them is a Detroit lawyer, closely associated with the automobile business, 15 years in the Naval Reserve. When the war broke out he entered the Naval Service, but they didn't leave him there. The Bureau of Aircraft Production needed him more, just as the Navy needed Major Wadsworth at the Naval Aircraft factory. Lieutenant H. H. Emmons was in charge of Motor Production, and I want you to hear him. (Applause.)

Lieutenant Emmons: Mr. Toastmaster and Members of the Association: It most certainly is not my intention to inflict on you at this time of night any long speech on the subject of engines, or of anything else connected with aircraft. You have heard from those who have preceded me the things that can be said much better than I could say them to you. But there are two things that I would like to bring to your attention in two or three minutes.

The first thing is that this war is the first war in history that has called for a large amount of industrially-made material different from any preceding war. Other wars have depended upon men and wagons and some artillery and the things that go with them. This war developed into a scientific fight, which called for an enormous amount of new industrial material, of many different kinds and types, such as airplanes and engines and tanks and gas and flame projectors and chemical

Inglis M. Uppercu, President Aeromarine Plane & Motor Corp.
(Photo.) Underwood & Underwood

work, and electrically-heated clothing, and instruments by the score, and things that never before had been used in any fight since the history of the world began.

Therefore, industry and manufacturers were called upon to produce this material as something new. Now, the first thing I would like to ask you to remember is just consider and look over this list of things and find out how much of it got to the front in time for the final fight, and you will find that there were more aircraft, more engines and more brains there than there were of any other kind of new industrial material made for this war.

Now, that was made by the members of this Association and others who are not closely connected with it, and who are not here tonight. . . .

For the eight years prior to 1916, the Army had ordered 59 airplanes and had received 54. During the year 1916, the Army had ordered 366 planes and had received 64. In other words, for the nine years prior to 1917, the Signal Corps of the Army had received the enormous sum of 118 airplanes. That was the equipment that they had had up to the date that we started this business, and that was all that they knew about them. Now, from that we had to start with a program laid down by the Joint Army and Navy Technical Board, calling for over 9,000 training planes and over 20,000 combat planes, and you gentlemen who have made any of this material know what it meant to tackle a job of that kind.

Now you made 9,000 of the training planes, you made the 16,000 training engines, and every one of them had been delivered and put into service, gentlemen, before the armistice was declared. (Applause.) . . .

By January of this year we would have been producing over 6,000 aviation engines of the Liberty type per month, and by April of this year we would have been producing 10,000 engines per month of every type. That is what the manufacturing interests of this country have done. Now that is only one item of production in the Bureau of Aircraft Production work.

I might tell you about balloons. The balloons are wonderfully interesting things. We had delivered over 700 of them by the time the armistice was declared. Our balloon companies went from the ships direct to the front, thoroughly equipped and prepared both as to men and material and took their place on the line at once. So that the country and the manufacturers of them in aircraft work have a right and ought to understand that the work that they have done has been absolutely marvelous, and that this criticism and talk and blackguarding that we have been subjected to is entirely uncalled for and it doesn't make any difference what source it comes from. (Applause.)

Mr. Ketterling was then introduced.

Mr. Ketterling's Remarks

Charles F. Kettering: Ladies and gentlemen, it is so late and there are other people here who have messages far more important than that which I could give you, that I am going to simply say this:

That in the great future of aviation there are more things for us to take into consideration than simply the production of the aircraft itself. We have the great problems of the commercial side of the thing.

The aircraft business at the present time reminds me somewhat of the situation of our having tremendous locomotive factories already building locomotives, shipping to some country where they had railroad tracks, suddenly being cut off from that supply and then trying to keep the locomotive business going. We have got to build some railroads, and we have got to go into the part of the aircraft which has to do with the actual operations of it.

At some time we shall be glad to present our views on this subject, but it is so late tonight, and as we have more important things coming, I will ask to be excused. (Applause.)

Otto Praeger, Second Assistant Postmaster-General, was the last speaker of the evening. He said in part:

Otto Praeger's Speech

Otto Praeger: Mr. Chairman and gentlemen, I need not say that this has been a pleasant evening and an instructive one. It is very different from the last session of the Aircraft Manufacturers with whom I sat in Washington, in the rooms of the National Advisory Committee some months ago. That was a regular lodge of sorrow. The bottom had dropped out of the war, and the manufacturers had come to talk with the War Department and the Navy Department on the future and the prospect of aviation, and the War Department said that they were stuck with the planes and they were going to demobilize. The Navy said it had plenty of planes and it was going to retrench, and the Post Office Department said its program was to utilize the unused planes after the war. . . .

(Continued on page 22)

Albert H. Flint, President L. W. F. Engineering Corp.

OBSERVING

Observation post of Civil War times

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The Dayton Wright Airplane Co.

DAYTON, OHIO

"The Birthplace of the Airplane"

Chief of Medical Section and Officers in Charge of Branches, Department Military Aeronautics.
Standing (left to right), Lieut. Col. S. M. DeLoffre, Lieut. Col. E. R. Lewis, Lieut. Col. I. H. Jones.
Sitting (left to right), Col. Nelson Gapen, Brig. Gen. T. C. Lyster, Chief; Lieut. Col. E. G. Seibert.
Taken in Executive Offices, Medical Section.

Photo Harris & Ewing.

FLIERS KILLED AT THE FRONT DURING 1918

Official List of American Commissioned Officers Lost

FAMOUS NAMES ON THE LIST

American and the 94th Aero Squadrons Credited with the Largest Honor Rolls in France

The War Department on Dec. 28 made public a list of 150 American commissioned officers of the Air Service who were killed in action at the front in 1918. The list, which has just been received by the Director of Military Aeronautics from the Air Service of the American Expeditionary Forces, contains the names of such well-known fliers as Major Victor Raoul Lufbery, Lieutenant Quentin Roosevelt, Captain Hamilton Coolidge, Lieutenant Charles Wesley Chapman, Lieutenant Frank Luke, Jr., Captain James Ely Miller, Richard Mortimer, Jr., Lieutenant Carter L. Ovington, Lieutenant Philip N. Rhinelander and David E. Putnam.

The American Aero Squadron credited with the greatest number of deaths of commissioned officers killed in action is the 1st. Nine of its commissioned officers were killed in action. The 94th Aero Squadron stands next, having lost eight commissioned officers in action in 1918. This was the squadron to which Major Lufbery was attached when killed. Four commissioned officers of the 95th Aero Squadron, of which Lieutenant Quentin Roosevelt was a member, were killed in action in 1918.

The List in Full

The complete list of the 150 American commissioned officers of the Air Service killed in action in 1918, with the date of their death, the detail to which they were attached at the time, and their emergency addresses follows:

Aldrich, Perry Henry, Oct. 29, First Lieutenant, 135th Aero Squadron, Essex Junction, Vt.

Angel, Cyril M., May 14, Second Lieutenant, 120th Aero Squadron, Attelboro, Mass.

Armstrong, Henry Guion, Oct. 4, First Lieutenant, 13th Aero Squadron, Memphis, Tenn.

Bahl, James Va Verne, Oct. 27, First Lieutenant, Italian front, Cleveland, Ohio.

Baker, H. T., Aug. 15, First Lieutenant (C.A.C.), 91st; no record.

Barber, Newell C., Aug. 12, Second Lieutenant, French Escadrille, Medford, Ore.

Beauchamp, Oliver T., Aug. 11, First Lieutenant, 27th, Princess Anne, Md.

Bellows, Franklin B., Sept. 13, Second Lieutenant, 50th, Williamette, Ill.

Bittenger, Howard P., Aug. 26, Second Lieutenant, Royal Air Force, 17th Squadron, 1 West 64th St., New York.

Bleckley, Erwin R., Oct. 15, Second Lieutenant, 50th, no address.

Blodgett, Richard Ashley, May 17, First Lieutenant, 95th, 174 Temple St., W. Newton, Mass.

Boldt, H. St. John, July 20, First Lieutenant, 1st Aero Squadron; no address.

Bowen, Joseph B., Sept. 7, Second Lieutenant., 32d Royal Air Force; Pawtucket, R. I.

Bowyer, James E., Sept. 12, Second Lieutenant, 135th Aero Squadron; Yankton, S. D.

Brodie, Clarence A., Oct. 1, First Lieutenant, 13th; 1039 N. Lawrence Av., Wichita, Kan.

Broomfield, Hugh D. G., Oct. 21, First Lieutenant, 93d; Gladstone, Ore.

Brotherton, William E., Oct. 10, Second Lieutenant, 147th; Chicago.

Bruce, Alexaander Bern, Aug. 17, First Lieutenant, 94th; Lawrence, Mass.

Burns, James S. D., Aug. 11, Second Lieutenant, 165th Inf., 88th; 880 West 180th St., New York.

Campbell, Burton L., Aug. 23, First Lieutenant, 17th Royal Air Force; Wakeman, Ohio.

Carpenter, J. I., June 11, First Lieutenant, 73d Royal Air Force; Rochelle, Ill.

Case, Lyman E., Aug. 11, First Lieutenant, 17th Royal Air Force; 210 S. Cherry St., Lamond, Iowa.

Cassard, Daniel W., July 16, First Lieutenant, 147th; Grand Rapids, Mich.

Chapman, Charles Wesley, May 3, Second Lieutenant, 94th; Jackson, Mich.

Cochran, Robert James, Oct. 10, First Lieutenant, 8th; Camilla, Ga.

Cochrane, Stanley L., Oct. 31, Second Lieutenant, 166th; Christ Field, Md.

Coleman, De Witt, Jr., Oct. 29, First Lieutenant, Italian front; Tenafly, N. J.

Collins, Phelps, March 15, Captain, 103; no address.

Coolidge, Hamilton, Oct. 27, Captain, 94th; Boston, or Harvard Univ.

Craig, Harry Worthington, Aug. 20, First Lieutenant, French Escadrille 12; Cleveland, Ohio.

Cronin, Edward M., Sept. 27, First Lieutenant, 96th; Bayonne, N. J.

Crumb, Harris E., Sept. 30, Second Lieutenant, 9th; St. Louis.

Curry, Irby R., Aug. 10, First Lieutenant, 95th; Marlin, Texas.

Carter, Edward Vivian, Oct. 21, First Lieutenant, 90th; Spokane, Wash.

Davidson, Gilford Council, Aug. 2, First Lieutenant; no address; no organization given.

Davis, Philip W., June 2, Second Lieutenant, 94th; Newton, Mass.

Dietz, Philip, July 30, First Lieutenant, 99th, R. A. F.; Roselle, N. J.

Dowd, Meredith, Oct. 23, Second Lieutenant, 177th; 76 Berkeley Av., Orange, N. J.

Forbes, Earl, Sept. 27, Second Lieutenant, 20th; Fairmont, Neb.

Emerson, William K. B., Jr., May 14, Second Lieutenant (F. A.), 12th; Rye, N. Y.

Hyman, Karl Henry, June 5, Second Lieutenant, Inf.; no record in D. M. A.

Fisher, John Jacob, Oct. 14, First Lieutenant; Punxsutawney, Penn.; no organization given.

Fox, Raymond F., Oct. 7, First Lieutenant, 1st; 491 Ashland Av., Buffalo, N. Y.

Frebisher, J. E., Captain, Sept. 8, no rank given, 148th, R. A. F., Arlington, N. J.

Fuller, Roswell Hayes, Sept. 20, First Lieutenant, 93, Chicago.

Gardiner, E. H., Sept. 14, Second Lieutenant, 50th, no record.

Garnsey, Edward Grant, Oct. 29, First Lieutenant, 94th, Chicago.

Garrett, Claude S., Oct. 10, First Lieutenant, 8th, Laurens, S. C.

View of one of the floors of the Department of Military Aeronautics

Photo Harris & Ewing

Giroux, Ernest A., May 22, First Lieutenant, 103d, Boston, Mass.

Goettler, Harold E., Oct. 6, Second Lieutenant, 50th, Chicago.

Gracis, Ralph D., Aug. 12, First Lieutenant, 17th, Bemidre, Minn.

Grider, John McG., June 18, First Lieutenant, 85th, Chicago.

Gundelach, Andre A. H., Sept. 14, First Lieutenant, R. A. F., and 96 A. S., Chicago.

Hamilton, Lloyd A., Aug. 26, First Lieutenant, 17th, R. A. F., Burlington, Va.

Hammer, Earl M., June 12, First Lieutenant, no organization given, San Francisco, Cal.

Hanscom, Austin F., Sept. 20, Second Lieutenant, C. A. C., 1st; no record.

Harris, David B., Sept. 27, Second Lieutenant, 20th; Chicago.

Hill, R. C., Sept. 14, First Lieutenant, F. A., 99th; no record.

Hirth, F. K., July 16, Second Lieutenant, C. A. C., 91st; no record.

Hitchcock, R. W., Sept. 4, First Lieutenant, 88th, Los Angeles, Cal.

Hobbs, Warren T., June 26, First Lieutenant 103d, Worcester, Mass.

Hunt, Jason Salon, Aug. 1, First Lieutenant, 27th, Johnson, Vt.

Jenkinson, Harry, Jr., Sept. 20, no rank given, 148th, R.A.F., Elizabeth, N. J..

Jerome, Gilbert M., July 12, First Lieutenant; no organization given, New Haven, Conn.

Johnson, Arthur Theo., Sept. 13, First Lieutenant, 135th, Chestertown, Ind.

Johnson, Conrad, Oct. 23, First Lieutenant; no organization given, Duluth, Minn.

Johnson, Harry F. W., May 21; no rank given, no organization given, South Bethlehem, Pa.

Johnson, Donald, Sept. 12, First Lieutenant, 104th, Harrisburg, Pa.

Kahle, Clarence C., Oct. 3, First Lieutenant, 99th, Pittsburgh, Pa.

Kearney, Thos. E., Aug. 14, First Lieutenant; no orgaanization given, Hemphis, Tenn.

Kessler, Samuel R., Jr., Oct. 9, Second Lieutenant, Inf., 24th; no record.

Kelty, Acher E., Sept. 26, First Lieutenant, 91st, Rice Lake, Wis.

Kennedy, Chester H., Oct. 23, Second Lieutenant, F. A., 1st, McMinnville, Tenn.

Ker, David, Sept. 12, First Lieutenant, 430 West 119th St., New York City.

Kimber, Arthur C., Sept. 26, First Lieutenant, 22d; no record of address.

Kinney, Clair A., Oct. 4, First Lieut, 49th, Endicott, Wash.

Kull, Geo. P., Sept. 14, First Lieutenant, Chicago.

Layton, Lawrence, July 28, First Lieutenant, F. R., Escadrille No. 77, Georgetown, Del.

Lehr, Manderson, July 15, First Lieutenant, F. R., Escadrille No. 117; Albion, Neb.

Loud, Harold D., Oct. 1, Second Lieutenant, 88th; Oscada, Mich.

Lowry, F. B., Sept. 26, Second Lieutenant, 91st; Memphis, Tenn.

Loughran, L. B., July 28, First Lieutenant, R. A. F.; 103 Park Av., New York.

Lufbery, Victor Raoul, May 19, Major, 94th; no record of address.

Luke, Frank, Jr., Sept. 30, First Lieutenant, 27th; Ptoenix, Ariz.

Lumsden, J. C., Aug. 13, Second Lieutenant, F. A., 12th; no record.

MacArthur, John, July 20, Second Lieutenant, 27th; Entiat, Wash.

Manier, Emmet Malone, Oct. 2, First Lieutenant, 117th French; Chicago.

Matthews, Alexander F., Aug. 24, First Lieutenant, 84th Squadron, R. A. F.; Louisburg, W. Va.

Matthews, Richard A., Sept. 27, First Lieutenant, 23d; 461 Fourth Av., New York City.

McClendon, Joel H., Aug. 11, First Lieutenant, 88th; Farmers Branch, Texas.

McCormick, John F., Nov. 7, First Lieutenant, 1st; Collins, Miss.

McCormick, Vaughn R., Sept. 12, Second Lieutenant, 139th; 766 Bedford Av., Columbus, Ohio.

Miller, James E., March 9, Captain, 95th; 60 Broadway, New York.

Miller, John O., Aug. 28, First Lieutenant, 12th; Fairview, N. C.

Miller, Walter B., Aug. 16, Second Lieutenant; Washingtonville, N. Y.

Moody, Richard W., July 16, Second Lieutenant; F. R. Escadrille, No. 12; 1408 Park Av., Minneapolis, Minn.

Moore, Frank N., Sept. 4, Second Lieutenant, 88th; no record address.

Morse, Guy E., Sept. 16, Second Lieutenant, 135th; 4238 Harrison St., Kansas City, Mo.

Mortimer, Richard, Jr., May 22; Tuxedo Park, N. Y.

Noble, Ralph M., May 14, Second Lieutenant; no address.

Norton, Frederick W., July 23, First Lieutenant, 27th; 172 West 1st Av., Columbus, Ohio.

Nutt, Alan, Sept. 26, First Lieutenant, 94th; Cliffside, N. J.

O'Donnell, Paul J., Sept. 26, Second Lieutenant, 96th; 1907 Market St., Wilmington, Del.

Offutt, Jarvis J., Aug. 13, First Lieutenant, 56th R. A. F.; 140 North 39th St., Omaha.

Ovington, Carter L., May 29, First Lieutenant, Escadrille No. 98; 25 Rue des Brodes, Paris, France.

Palmer, Keene M., Oct. 3, First Lieutenant, 104th; South Dayton, N. Y.

Parker, Raymond W., May 4, Second Lieutenant, with French; no address.

Parrott, Edmund A., Sept. 26, First Lieutenant, 20th; San Mateo, Cal.

Patterson, Alfred D., Oct. 29, First Lieutenant, 93d; 438 Franklin Av., Wilkinsburg, Penn.

Petree, Harris E., Sept. 26, First Lieutenant, 22d; 1236 Euclid St., N. W., Washington, D. C.

Phillips, Walter A., Oct. 7, First Lieutenant, 1st; no address.

Plummer, Charles W., Aug. 11, Second Lieutenant, 88th; no address.

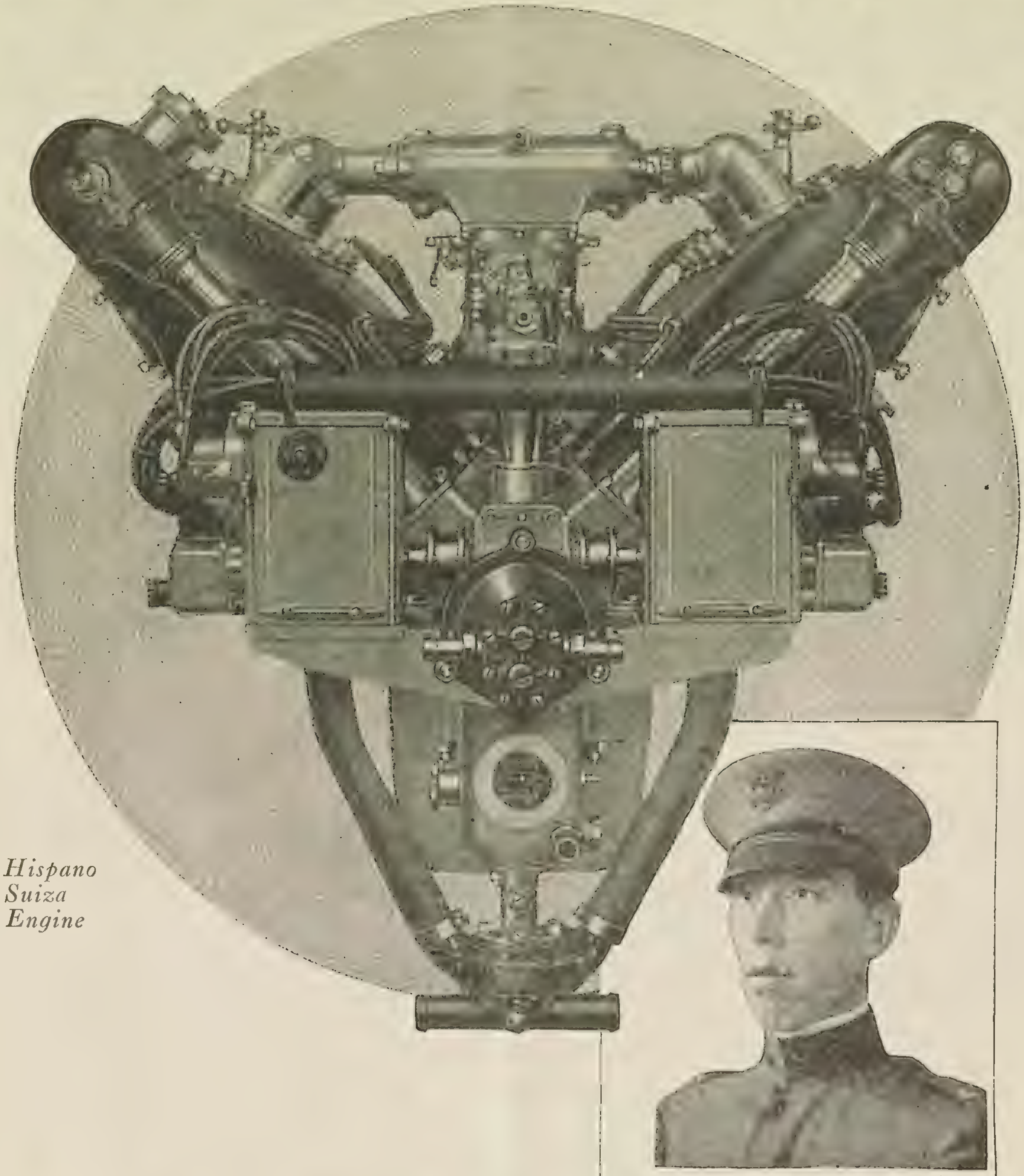
Potter, W. M. C., Oct. 10, First Lieutenant, 20th; care H. G. Campbell, 11 Wall St., New York, N. Y.

Prentice, Lee C., Aug. 1, Second Lieutenant, 104th R. A. F.; 301 Park Av., Albert Lea, Minn.

Putnam, David E., Sept. 14, First Lieutenant, 139th; 1374 Commonwealth Av., Awlston, Mass.

(*Continued on page 22*)

HISPANO



Hispano Suiza Engine

CAPT. R. W. SCHROEDER, U. S. A.
Holder of World's Altitude Record

WRIGHT-MARTIN

SUIZA

Three World's Records

THE Hispano-Suiza Motor has been the means of three recent world's records in aviation.

The first is an altitude record. Capt. R. W. Schroeder, U. S. A., on September 18, 1918, attained an altitude of 28,900 feet, only 102 feet short of the highest mountain peak in the world, at Wilbur Wright Field.

The second world's record recently made by Hispano-Suiza was made by the D.17, an American dirigible with twin Hispano-Suiza Motors, the first of its type to be flown, which on October 22nd flew approximately 315 miles from Akron, Ohio, to Rockaway, New York.

The third record recently made by Hispano-Suiza is the world's altitude and speed record for two men (unofficial). In this test a Loening two-seater monoplane with a 300 hp. Hispano-Suiza engine, developed 145 miles per hour with full military load including four guns, which is in excess of any record made by a European single-seater combat machine. The Loening plane in these tests also climbed 25,000 feet in remarkable time, carrying two passengers.

Founded on the basically correct principles of a great motor, Hispano-Suiza under the leading minds of the industry and the tremendous test of service has become the greatest aeroplane motor in the world. The tremendous experience which its manufacturers have undergone has prepared them for after-the-war activities of hitherto unprecedented magnitude.

Wright-Martin
Aircraft Corporation
New Brunswick, N. J., U. S. A.

AIRCRAFT CORP'N.

BALLOON WORK IN FRANCE IS COMMENDED

Col. John A. Paegelow, First Army, Tells of Our Activities

ADVANCED OVER 250 MILES

Thanked by the Air Service for Securing Confirmation for the Aviators of the Pursuit Groups

Following is a report of the activities of balloon companies in the Allied offensive of Sept. 26-Nov. 11, received by the Balloon Branch of the Training Section, Division of Military Aeronautics, from Lieut. Col. John A. Paegelow, Commander Balloons, First Army:

Thirteen Companies Engaged

Thirteen American balloon companies were engaged in the operation between the Meuse River and the Argonne Forest, which began Sept. 26, 1918. Two French balloons took part in the early part of the action.

The balloons moved to this front from the St. Mihiel sector on the night of Sept. 20. The number of American balloons on the Verdun front increased from one to thirteen within twelve hours. The Balloon Companies were:

First Corps—First Company, Clermont-en-Argonne; Second Company, Locheres, and Fifth Company, Auzeville (in reserve).

Third Corps—Third Company, Ferme-de-Choisel (in reserve); Fourth Company, Fromerville; Ninth Company, Thierville, and Forty-second Company, Bois-des-Sartelles (in reserve).

Fifth Corps—Sixth Company, Ravine Jouy-on-Argonne; Seventh Company, Bois-Bethainville (near Dombaslo-en-Argonne); Eighth Company, Bois-Foys (near Brabant), and Twelfth Company, Jouy-en-Argonne.

Army Artillery—Eleventh Company, Fromereville (Verdun grouping); Forty-third Company, Parois (Aire grouping); Thirty-ninth Company (French), Vraincourt (Meuse grouping), and Ninety-third Company (French), Aisne grouping.

The furthest points of advance of the American balloons are indicated by the following enumerations:

First Corps—First Company, Apremont; Second Company, Les Petites Armoises, and Fifth Company, La Basace.

Third Corps—Third Company, Montfaucon; Fourth Company, Peuvillers; Ninth Company, Damvillers, and Forty-second Company, Villers-derant-Dun.

Fifth Corps—Sixth Company, Montfaucon; Seventh Company, Cesse; Eighth Company, Lanerville, and Twelfth Company, Litanne.

Army Artllery—Eleventh Company, Fontaine, and Forty-third Company, Nonart.

Advanced More Than 250 Miles

The study of the map reveals that between "H" hour on Sept. 26, and 11 o'clock on Nov. 11, when the armistice was signed, the American balloons in the Meuse offensive made an aggregate advance of 425 kilometres. This estimate is computed by measurement in direct line from original position to ultimate position. The actual road miles practically doubled the total above stated. Much of the transport, moreover, was conducted by hand—the balloon being taken over open fields, through country ridden by shell holes and strewn with barbed wire. In several instances the balloon was transported without a winch for distances of ten kilometres at a time. It is known that the balloons, in a few cases, were within twelve hours behind the infantry in crossing No Man's Land.

Activity

The American balloons in the Verdun sector, between Sept. 26 and Oct. 13, reported enemy planes 2,071 times. Our balloons in this sector, during this period, reported enemy shells falling 551 times.

During the single week from Oct. 28 to Nov. 3 the American balloons reported enemy shells falling 1,152 times.

During the two weeks from Oct. 21 to Nov. 3 the American balloons reported enemy planes 221 times.

Chief Greely's Letter

The recognition of the work performed by the American balloons is illustrated in the folowing letter from J. H. Greely, Chief of Staff, First Division, A. E. F., addressed to the commanding officer, Second Balloon Company:

"The Commanding General, First Division, directs me to express to you his appreciation and the appreciation of the division for the services rendered by your organization during the operations participated in by this division between the Meuse and the Argonne from Sept. 29 to Oct. 11, inclusive. The energy and alertness of your organization which enabled the frequent identification of artillery targets were great value to the division."

Enemy Activity

The 69th and 93rd French Balloon Companies took part in the early days of the offensive, but soon went out of action, due to the sickness of a large percentage of the personnel.

The 12th Balloon Co. relieved the 6th Balloon Co. on Oct. 16; the 5th Balloon Co. relieved the 1st Balloon Co. on Oct. 17; the 42nd Balloon Co. relieved the 3rd Balloon Co. on Oct. 25; the 3rd Co. shortly, however, relieved the 77th French Balloon Co. in the sector of the 33rd French Corps, across the Meuse.

An anomaly of enemy aerial activity is suggested by the following statistics: During the week from Sept. 30 to Oct. 6 the balloons in the Verdun sector reported enemy planes 946 times, whereas during the same week our balloons of the Fourth Corps reported enemy planes only 34 times in that sector. On the other hand, during this period our balloons in the Verdun sector reported enemy balloons only 59 times on the entire front between the Meuse and the Argonne, whereas the balloons of the Fourth Corps reported 55 balloons in that sector.

Thanked by the Air Service

An unusual service rendered by the Army Balloon Office was the systematic effort to secure confirmations for the aviators of the pursuit groups. The success in this matter may be indicated by the fact that the balloon companies reported enemy planes falling in flames or out of control seventy-five times. This figure compared with the fact that the First Pursuit Group claimed a total of seventy-two victories and the Third Pursuit Group claimed a total of thirty-five victories, indicates that the balloons kept a reasonably accurate check upon the aviation's exploits. The days of poor visibility rendered the task difficult, but lookouts of each company were constantly stationed on the ground, even when the balloon was not in ascension. The appreciaion of this service is expressed in the following letter from Major H. E. Hartley, First Pursuit Group, Air Service, A. E. F., to Major Paegelow:

"I wish to express for both myself and the pilots of this group my thanks to yourself and to the balloon companies under your command for the invaluable assistance which they have given us, both in conducting our operations and in obtaining confirmations of our victories.

"We realize and appreciate deeply the interest which you have shown in our work; your willingness to assist the pilots in every manner possible, and your appreciation of their efforts has stimulated them to better and more daring work.

"If in any way the First Pursuit Group could further cooperate with the Balloon Section, do not hesitate to call upon us."

Balloons Destroyed

We lost twenty-one balloons between Sept. 26 and Nov. 11, fifteen of these balloons were destroyed by enemy airplanes, six by enemy shells. The enemy is believed to have lost at least fifty balloons during the same period.

Our anti-aircraft and machine guns drove off many enemy attacks. The 6th Co. brought down two enemy planes with its machine guns in two consecutive days. The 2nd Co. brought down one plane.

Parachute Jumps

The 11th Balloon was attacked four times on Oct. 6, First Lieut. J. A. McDevitt and Second Lieut. G. D. Armstrong each jumped twice. This makes a total of four jumps for Lieut. McDevitt, three of which were made within the same twenty-four hours.

First Lieut. W. J. R. Taylor, 6th Co. Lieuts. B. T. Burt and J. A. Higgs 7th Co., have made four jumps. A total of approximately thirty parachute jumps have been made during the present offensive.

First Lieutenant D. M. Reeves, a student observer with the 7th Co., was in the air only four hours and made three parachute jumps. Two balloons were burned over his head.

Casualties

First Lieut. C. J. Ross, 8th Balloon Co., was killed on the first day of the offensive. While conducting an adjustment of fire his balloon was attacked and burned. Lieut. Ross permitted his fellow observer in the basket to jump first. Fragments of the burning balloon fell upon Lieut. Ross' parachute, burning it and causing his body to crash to the ground.

Second Lieut. M. D. Sapiro, 12th Co. was injured in a fall from the basket.

First Lieut. D. Q. Hammond, observer of the 7th Co., was severely gassed while on an information liaison mission in the front line.

Second Lieut. J. C. Rivers and the telephone detail of the 7th Co. were subject to continuous shell fire in the neighborhood of Gesnes, during the last week of October. One man was seriously wounded.

The 7th Co. was bombed in its transport through Tailly, in the course of which operation two enlisted men were seriously wounded.

The Last Attack

The final and decisive attack, which began Nov. 1 and closed Nov. 11, put to the test the morale and efficiency of the American Balloon Service. The infantry advanced from the Bois d'Bethainville line to Mouson Beaumont and Sedan within seven days. The balloons followed this advance with untiring and unceasing energy. The balloons operated during the day and advanced at night. The officers and men slept in the open, in cold and inclement weather, without shelter. This, to be sure, is only the hardship which the infantry endures. The infantry, however, is relieved. These balloon companies—many of them—have been on the front without relief and with no leaves of absence through the Chateau-Thierry, St. Mihiel and Verdun offensive. The problem of transporting a 1,000 cubic meter balloon over roads which our artillery has wrecked, through woods where trees overhand and endanger the cable, past traffic which was blockaded and jammed—this problem was faced and solved by the American Balloon Companies.

General Summerall's Commendation

The highest tribute that can be paid to the merit and zeal of the American Balloon Companies is contained in a letter from Major Gen. G. P. Summerall, Commanding General, Fifth Army Corps. This letter, though addressed to the balloon companies of the Fifth Corps, is expressive of the part which the balloons of all corps took in the bringing to a successful termination of the four years' war. The letter says:

(c) *Underwood & Underwood*

Major-Gen. Sir William Brancker

Will Direct Aerial Transportation for an Important British Company

Major-Gen. Sir William Brancker, who recently visited America on a British mission, is taking an important post in connection with the Aircraft Manufacturing Company, of which Holt Thomas is managing director.

Announcement has been made already that this company is arranging an aerial passenger service between London and Paris. Plans will be developed in many other directions, including air-lines from London to Glasgow, Edinburgh, Manchester, Newcastle, Wales and Ireland; also external lines from London to Sweden, Denmark, Holland, Spain and Italy.

General Brancker will direct this scheme of aerial transport and also the higher aspects of international flying, the creation and development of an organization of pilots and airplanes. He will plan also the air routes over land, with landing grounds every ten miles, including a route from England to India, and at sea will look after the placing of a series of mark boats at intervals of 200 miles.

An American-British translantic air commerce line is one of the ultimate features which he will control, while still retaining the rank of Major-General in the Royal Air Service. Obtaining his services is regarded as a great triumph for the company.

DE H-4's NOT SUITED TO THE AERIAL MAIL

New York-Chicago Service Is Now Temporarily Postponed

HANDLEY PAGES TO BE USED

Striking Illustration of the Economy So Urgently Advocated by Well-Meaning, If Badly Advised Congressmen

After giving them thorough tests of every kind, the Post Office Department on Dec. 30 reached the conclusion that DeHaviland planes are not adapted for the work of the Aerial Mail Service. This fact was clearly pointed out in the AIR SERVICE JOURNAL of Dec. 28. Although fit for active fighting in war, their construction has been found to be too weak for the pursuits of peace, and all planes of this type to the number of about 100, which were turned over to the Department by the War Department, have been returned as unserviceable for carrying the mails on the New York-Cleveland-Chicago, as well as on the Washington-New York route. The incident carries its own comment of this American-built machine of English design.

As a result, the operation of this air line, which failed to function on account of faulty engine construction and repeated engine troubles, and was postponed to Jan. 2, has been suspended indefinitely, or until a dozen Handley Pages can be assembled from material supplied by the War Department. These were among the 210 machines ordered in the Post Office Appropriation Bill recently passed by the House of Representatives to be delivered to the P. O. D. by the W. D.

Congressional Economy?

Chief reliance for the eventually successful inauguration or continuation of routes, therefore, is apparently to be placed upon another machine of foreign type, as only ten strictly all-American planes were included in the appropriation item of the bill referred to. Perhaps, in these incidents an all-wise Congress sees an illustration of that economy for which it argued when this service was "strafed" in the recent debate, or perhaps it may be like the familiar soap sign of former years, "Now you see it" and "Now you don't."

On the other hand, others will see in them good reasons for taking broad ground for an "all wool and a yard wide" American aeronautical construction policy, with an eye wide open to whatever of peace or war the future may bring and backed by the Government with a liberal appropriation to put the industry and the program on a constructive rather than a destructive basis.

De Haviland 4 Not Feasible

But let the Post Office Department tell its own story of the latest fiasco. Here it is just as issued:

"Extensive field tests and service tests between New York and Chicago and between New York and Washington in actual carrying of the mail have demonstrated that the DeHaviland 4 is not a type of machine feasible for cross country flying with a load of mail. The Department has succeeded in sending planes through to Chicago, Bryan and Cleveland, Ohio, and Bellefonte, Pa., and making a number of successful trips carrying mail between New York and Washington, with the DeHaviland plane, but its structure is not designed for carrying burdens, and machines have crumpled in making landings and in taking off for flights, because they are not adapted for cross country work in carrying loads.

Awaiting Handley Pages

"For this reason a heavier machine will be necessary and such planes are now being set up from the parts in the possession of the Post Office Department. Such planes have proven successful on the New York-Washington route with no casualties and comparatively few bad accidents to the planes. The War Department has turned over to the Post Office Department the material for twelve twin-motor Handley Page airplanes and these will be set up for use on the New York-Chicago route. Until this new equipment can be placed in the service the route from New York to Cleveland and Chicago, which was to have gone into effect Jan. 2, will be postponed.

"The Post Office Department has tried out the DeHaviland planes turned over to it by the War Department and in every way given them a thorough test and it is found that they are not constructed so as to be serviceable for cross country flying carrying the weight of mail. All of these planes—about 100—have been turned back to the War Department."

While officially the New York Chicago air mail service is indefinitely postponed it is understood that test ships will be continued. In these tests the Curtis R, equipped with the low compression type of Liberty engine, and a new type of Curtiss machine, propelled by the same kind of motor and carrying 800 pounds of mail will be used. The speed of the new machine is given as 140 m. p. h. with a landing speed of 40 m. p. h.

Among the fliers there is said to be a marked preference for the Glenn-Martin twin engined machine because of its ability to maintain flight on one engine, thus eliminating the danger of forced landings.

A change of route also is impending. It is thought that a more northerly lane will prove less dangerous, owing to the fact that it passes over a more open country—woodland being one of the particular bugbears of aviators.

Last Announcement

Important progress for the resumption of operations on the New York-Chicago route of the Aerial Mail Service was announced by the Post Office Department on Monday of this week. The exact date when flights will be made again has not yet been determined, but it is stated that the plans for the utilization of war material and the modification of unsatisfactory equipment should be completed so that the service may begin within a few weeks.

These plans include the construction, with the material turned over by the War Department, of airplanes with a redistribution of weight so as to combine a satisfactory mail-carrying capacity with greatest safety for the pilot. The planes will be powered with a low compression engine, will have a special compartment for holding the mail bags, and will be changed from the original design, as may be necessary, to adapt them to the work required.

In addition, the Department has a staff of Liberty engine and other mechanics, and riggers; five regular or emergency landing fields between the New York and Chicago terminals, with an extra plane, help and facilities at each, and also twelve experienced fliers. It is evident, therefore, that the greatest care in every particular is being taken to make the reinauguration of the new air line a success.

J. B. Corridon, Supt. Air Mail Service

UNCLE SAM UNDER MORAL OBLIGATIONS

War Material Manufacturers Ask for Prompt Payment

DENT AND HITCHCOCK BILLS

Senate Military Committee Rejects the First and Reports Out the Second Measure While Contractors Meet

More than 200 war material manufacturers from all parts of the United States and Canada in all day session at Cleveland, O., Jan. 3, organized the Association of Manufacturers of War Materials, with a view to concerted effort to ask Congress to enact legislation which will permit payment by the Government of obligations arising from informal contracts entered into under the stress of war conditions.

Unless speedy discharge of these obligations, aggregating over $1,500,000,000, is made possible, serious disturbance of the country's industrial conditions was predicted.

The manufacturers adopted a resolution recommending the immediate passage of the Dent bill, with necessary amendments to meet the situation, asking Secretary of War Baker to take steps immediately to check the claims of sub-contractors, and urging immediate payment of such amounts as "may clearly appear to be due."

The contractors unanimously opposed the plan of Senator Hitchcock legalizing the contracts in question, but placing adjustment of the obligations in the hands of a "non-interested commission." They contended the Hitchcock method would interminably delay settlement of their claims.

The Dent bill, it was pointed out by W. S. Symington, Jr., of Chicago, who was chosen President of the association, is loosely drawn in many respects. He cited that it provides for payment of contracts where manufacture has not begun and where production is in full swing, leaving a gap with respect to concerns that have launched upon partial production.

Mr. Symington also pointed out the measure provides for payment for "fair value" of materials on hand. This, he says, is vague.

Prime contractors declare that under existing conditions they cannot comply with the request of the War Department to settle with their sub-contractors. They maintain such a procedure would be inequitable to them, inasmuch as Congress might indefinitely hold up enactment of a law to authorize such reimbursement by the Government.

Each member of the organization was urged to enlist the support of their employees and of the American Federation of Labor to bring every possible pressure to bear upon Congress to relieve the situation.

Several present and former War Department officials who had a part in the awarding of contracts, most of them verbally, by telephone or telegraph, attended the meeting. They expressed their conviction of the Government's moral obligation to reimburse the contractors.

Henry M. Dinneen of Baltimore was named temporary secretary of the association.

Adjustment of Informal Contracts

By unanimous vote the Senate Military Committee Jan. 3 rejected Secretary Baker's recommendations for legislation to validate informal war contracts and authorize their adjustment by the War Department, and ordered favorably reported Senator Hitchcock's bill, introduced Jan. 2, legalizing such contracts, but placing adjustment in the hands of a non-interested commission.

"THE OPE

Curtiss Achievements

1—The design and construction of the fastest fighting airplane ever flo
Official Government records credit this triplane, which was built for the U.
Navy, known as model 18-T, with 160 miles per hour, carrying full milit
load, pilot and passenger. This is 15 miles per hour faster than any sp
ever claimed for an airplane, a truly epoch-making achievement, made poss
by the development of our new model K. motor.

2—The design and construction for the Navy of the largest flying boats in
world, colossal crafts capable of carrying five tons useful load. It was
of these boats that recently carried fifty passengers.

3—The design and construction for the U. S. Navy of the fastest and most e
cient Seaplane in service anywhere. This craft, which is known as the Cur
model H-A, with Liberty motor, made an official speed of 126 miles per h
with full military load, armament, ammunition, pilot and passenger.

The Curtiss Engineering Corporation is today the center of aeronau
coming of peace. Glenn H. Curtiss and his engineers have been busy in
carrying forward the production of suitable commercial types. Aircraft
are already available, and are as superior in design, workmanship and per

CURTISS ENGINEERING CO

rtiss

N BOOK"

The Great War

4—The development and construction of a 12 cylinder, 400 H.P. motor of an entirely new and much lighter type, known as the Curtiss model K-12. These motors have undergone exhaustive tests and are already in production.

5—The development and construction of the Curtiss model K-6, a new and much lighter 6 cylinder motor. This engine develops 160 H.P. and possesses greatest endurance and reliability.

6—The development and construction on a large scale of the Curtiss OXX motors, and the J-N-4 training planes, which were used almost exclusively by the United States and Canada and largely in England for the training of American and British aviators. The training of over seven-tenths of the original land and marine flying pilots, most of whom entered the service and formed the nucleus of the United States Aerial Training Forces.

opment. Its activities, instead of being decreased, will be increased by the
oms, research laboratories, wind tunnels and shops in perfecting designs and
designed for sportsman's use, mail carrying and other peace-time purposes
s Curtiss military planes have proved themselves to be.

ATION, GARDEN CITY, L. I.

INSISTS UPON $35,000,000 FOR NAVY AVIATION

Secretary Daniels Firm Before the House Committee

SMALL LANDING STATIONS

Wants to Continue Experimentation and Development on a Very Much Larger Scale

Secretary Daniels was before the House Committee on Naval Affairs several times last week in regard to appropriations for the various activities of the Navy Department during the fiscal year 1919-1920.

New estimates were submitted, reducing the total asked for from the original amount of $2,664,307,000 to $995,903,000, of which $35,000,000 is requested for aviation.

The aviation appropriation item was reached during the forenoon of New Year Day. Representatives William Kettner, of California, and Frederick C. Hicks, of New York, took part in the discussion.

In reply to a question by Mr. Kettner, Secretary Daniels stated that the naval aviation program on the Pacific coast is to have the chief bases at Pensacola and San Diego and to continue the present stations. " We have," he said, " one in Massachusetts, one at Long Island, and at Hampton Roads, and some other coastal stations. In the early estimates we intended to have many new ones, and if the war had gone on it would have been necessary to have done so, but for the present my recommendation is that the aviation stations at San Diego and Pensacola be strengthened and that we continue the other coastal stations, but not add any large ones."

As to finishing the San Diego station, Secretary Daniels said that the department has enough money to provide everything needed there, but he was not inclined to put very much more money in aviation on the ground.

" My feeling is that in the next few years most of the money we spend on aviation ought to be spent on experimentation, developing new types of machines and trying to develop better and better machines."

Asked whether he did not think that his estimate of $85,000,000 in the bill to be rather high, Secretary Daniels replied that this figure had been reduced to $35,000,000. " I went over it very carefully," he explained, " and excluded all these new coastal stations. We had one proposed for the Virgin Islands, and two or three in the Caribean and in the Gulf and two or three on the Pacific coast, in the north, and one at Hawaii and in the Philippines and other places."

Secretary Daniels reiterated his belief that the money appropriated for aviation ought largely to be spent on new development and on only present stations —that little money should be spent on the ground, but a great deal of money in brains, experiment and study.

Asking for an appropriation of $600,000,000 for continuing the three-year naval building program, Secretary Daniels submitted figures of the comparative strength of the world's navies. These showed that Great Britain has 220 airships, France, 30, Russia, 14, and Japan, 2.

"Mother" Ship for Seaplanes

Recommendation for the construction of a new type of "mother" ship for launching seaplanes was recommended to the House committee on Naval Affairs at a hearing on Jan. 3 by Rear Admiral Hugh Rodman. "These planes," he said, "should be armed with torpedoes rather than by mere explosive bombs."

He explained that the torpedo is much more effective, because it explodes under water and hits a vital portion of a ship, while bombs dropped from above are not only hard to aim but are less effective and do little more than local injury.

He confirmed reports that Great Britain has so-called "flying torpedo boats," which are virtually airplanes equipped with torpedoes. These machines, he said, had a four hour endurance and a speed of about 125 miles an hour.

"The mother ship for airplanes certainly is vital to all future navies," said Admiral Rodman. "I have seen them operate and know they are a necessity. They are in the embryo stage at present, but it is essential that the American navy should carry on experiments to develop such ships and that they should be made an additional complement to the fighting fleet."

Discharges from the Air Service

The committee on the discharge of officers from the Air Service, Bureau of Aircraft Production, is composed of Lieut.-Col. R. M. Jones, Assistant Executive Officer of the Bureau; Lieut.-Col. H. M. Clark, Chief of the Personnel Department, Administration Division, and Major H. M. Jones, Executive Office of the Personnel Department. Major Jones is the recorder.

As a coincidence, the total number of officers whose discharges were authorized by this committee during the week Dec. 23-28, was the same as discharged from Aeronautics, viz., 21. One of them was a major, four were captains, seven first lieutenants and nine second lieutenants. Following is the list of officers' names:

Major, Harry D. Moore.

Captains—John E. Barbey, Warren F. Kaynor, Robert L. Chamberlain and Robert E. Christie.

First Lieutenants—Horace C. Jennings, Edwin A. Gottlieb, Theodore H. Bailey, Jr., Charles W. King, William S. Stafford, Virgil R. Lynch and Charles T. Gilbert.

Second Lieutenants—Howard M. Spielman, Harold B. Bryant, Harry G. West, Roy F. Wilcox, Lawrence R. Adams, Charles D. Thompson, David S. Starring, Verne W. Brinkerhoff and Henry Clark Townsend.

Up to Dec. 28, inclusive, the total number of discharges of officers authorized by the Air Service, Division of Military Aeronautics was 4583. For the week ending on that date the number of officers discharged was 1547, of whom 1526 were in the field, and who were distributed as follows:

Barron Field 2, Brooks Field 4, Call Field 4, Carlstrom Field 4, Carruthers Field 18, Chanute Field 1, Dorr Field 2, Eberts Field 4, Ellington Field 4, Gerstner Field 91, Hazelhurst Field 26, Kelly Field 121, Langley Field 60, Love Field 59, March Field 43, Mather Field 3, Park Field 3, Payne Field 156, Post Field 123, Rich Field 45, Rockwell Field 290, Selfridge Field 9, Scott Field 4, Souther Field 3, Taliaferro Field 237, Taylor Field 6, Wilbur Wright Field 6, School of Military Aeronautics, Austin, Texas, 2; School of Military Aeronautics, Ithaca, N. Y., 14; School of Military Aeronautics, Berkeley, Cal., 3; School of Military Aeronautics, Princeton, 1; Arcadia, Cal., 48; Camp McClellan 1, Fort Omaha 3, Lee Hall 1, Garden City 4, Morrison, Va., 22; Camp Dix 38, Rochester, N. Y., 1; Hoboken, N. J., 4; Middleton, Va., 2; Pittsburgh, Pa., 1; Indianapolis, Ind., 1; St. Paul 14, Buffalo, N. Y., 1; Montgomery, Ala., 4; Dallas, Texas, 6, Park Place, Houston, Tex., 2; Chandler Field 1, Akron, Ohio, 1; Madison Barracks 1, Aberdeen 11, Camp Sherman 4, Camp Gordon 1, Camp Taylor 2, Camp Dodge 8, Camp Kearney 9, Camp Louis 5, Camp Custer 2, Camp Funston 5, Camp Grant 2, Camp Jackson 6.

Honorable discharges from the Air Service, Headquarters of the Division of Military Aeronautics, for the week Dec. 16-21, totaled forty-one, of whom two were lieutenant-colonels, three majors, five captains, eleven first lieutenants and twenty second lieutenants. The official list follows:

Lieut. Cols. Harry A. Toulmin and Henry M. Byllesby.

Majors Frank C. Page, Daniel M. Henry and Alfred Ely.

First Lieuts. James C. Clark, Herbert H. Fish, Marlowe M. Merrick, John J. O'Brien, J. Brooks B. Parker, Ralph A. Shelly, Robert Sedgwick, Jr., Walter H. McCarthy, Norman W. Oyster, George B. Thummel and Clarence H. Young.

Second Lieuts. James G. Barnes, Homer D. Burch, Earl D. Chambers, John H. Davidson, Lloyd E. Davis, Charles B. Gillet, Thorp Hiscock, Victor L. Hussagh, William D. Herring, Melvin W. Hodgson, Charles W. Isbell, Attillio F. Lipari, Daniel Males, Richard V. Nuttall, Chester P. Ray, Jr., Walter C. Schroeder, Carl M. Smith, George A. Turley, John E. Whinery and Albert F. White.

From Dec. 14 to Dec. 20, inclusive, forty-nine officers were honorably discharged from the Air Service, Bureau of Aircraft Production. Two of them were lieutenant-colonels, seven majors, thirteen captains, thirteen first lieutenants, and fourteen second lieutenants. Following is the official list:

Lieut.-Cols. Elbert J. Hall and Samuel E. Wolff.

Majors John C. Cowdin, Waldon W. Shaw, Harry A. Bubb, Ernest B. Black, Charles McF. Hall, Milton J. Warner and Lewis B. Preston.

Capts. John A. Larkin, Nicholas E. O'Conner, James F. Alexander, Victor A. Remy, William A. Horrell, Edwin W. Dunlap, Morgan Butler, Paris R. Foreman, Walter L. Mitchell, Thomas M. Childs, Edward A. Callanan, Francis X. Murray and Stanley J. Halle.

First Lieuts. Charles R. Logan, Frederick Kuhne, Harold L. Chalifoux, Paul L. Cross, William Walzer, Graham C. Dugas, John E. Espey, Leigh D. Guyer, Tod Ford, Fred R. Estabrook, Joseph H. Peterson, Joseph F. Cox and Matthew Lahti.

Second Lieuts. Alfred C. Bame, Frederick A. Jenks, Roland G. E. Ullman, Joseph K. Hooker, John D. Clarke, Lee E. Hildebrand, William W. Smith, Edward E. Tanner, Stuart H. Frank, John B. Spencer, Edwin M. King, Glenn E. Miller, Warren Weaver and William A. Louis.

The total authorized discharges from headquarters, D. M. A., up to Dec. 28, were 177, and for the week 21. The names of officers discharged during the week are:

Major, Fred A. Preston.

Captains—Madison Bentley and Julies A. Ripley.

First Lieutenants—Charles F. Reavis, Jr., Harold R. Smoot, Earle F. Stewart and Otis H. Williamson.

Second Lieutenants — William M. Clearwater, George A. Crocker, Jr., John H. Eden, Jr., Robert H. Gillmore, Edward C. Hauer, John S. Henderson, Jack R. Houck, Michael Mennies, Hudson R. Searing, Ralph C. Trovillion, Robert A. Trovillion, Allen W. Valentine, John M. Vandergrift and Joseph Wood, Jr.

From Dec. 27 to Jan. 3, forty-eight officers, two of the grade of lieutenant colonels, six majors, sixteen captains, fourteen first lieutenants, and ten second lieutenants, were discharged from the Bureau of Aircraft Production, as follows:

Lieut. Cols. Robert A. Millikan and Leonard S. Horner.

Majors Elliot C. Cowdin, George L. Norris, Donald D. Davis, Ronald T. Lyman, Arthur G. Newton and Henry W. Torney.

Capts. Ralph L. Pope, Lionel M. Woolson, Ernest B. Tracy, Oscar R. Ewing, Clement R. Ford, John W. Heaney, Edward W. Beach, Frank Briscoe, Henry W. Butler, Charles W. Howard, Carl E. Sullivan, Charles A. Proctor, William H. Schulzke, Thomas D. Cope, Glover E. Ruckstell and Abbot A. Lane.

First Lieuts. Warner D. Orvis, Charles S. Dwight, Chester H. Bliss, William N. Brockway, John T. Tate, Henry L. Freese, George E. Lippincott, James C. Marks, Thomas H. White, Benton G. Wood, James L. Dohr, James A. Pearson, Elbert L. Richardson and Frederic M. Sibley.

Second Lieuts. Lutellus Smith, Jr., Edward C. Bartlett, Clarence J. Carey, Edgar L. McCaulley, Russell L. Steinert, John S. Boyce, Walter M. Boyden, Arthur C. Klages, Alexander Klemin and William Smith.

During the week ended Jan. 4, there were thirty-seven officers discharged from the headquarters of the Division of Military Aeronautics. Of this number, four were majors; two captains; ten first lieutenants, and twenty-one second lieutenants:

Majors—Roger Amory, John K. Mitchell, Robert S. Potter and George R. Wadsworth.

Capts.—Adelbert Ames, Jr., Hamilton H. Salmon.

First Lieuts.—Peter Abrams, James N. Bobbitt, William E. Dean, Robert C. Hamlon, Graham Roberts, George Taylor, Henry L. Taylor, Paul D. Weathers, Edwin E. Weise and Frank O. Yates.

Second Lieuts.—Alanson W. Aird, Joseph P. Annin, Frank H. Carter, Aubrey Drury, Norman Dunning, George F. French, Percival Gilbert, William S. Gwynn, Henry S. Harvey, Albert H. Henderson, Edward W. Ilett, Charles King, William E. Lewis, William T. Nelson, Herbert R. Pyne, Joseph R. Rollins, Joseph H. Ross, John C. Rowland, Herbert R. Sheppard, Herman L. Underhill and Eppa H. Willis.

This brings the total discharges at Headquarters of the Division up to 213, of whom two were lieutenant colonels; fourteen majors; thirty-seven captains; sixty-one first lieutenants, and 100 second lieutenants.

ENGLAND LONG HAD A FLYING TORPEDO BOAT

An Important Factor in Causing Germany's Surrender

MACHINE EASILY LAUNCHED

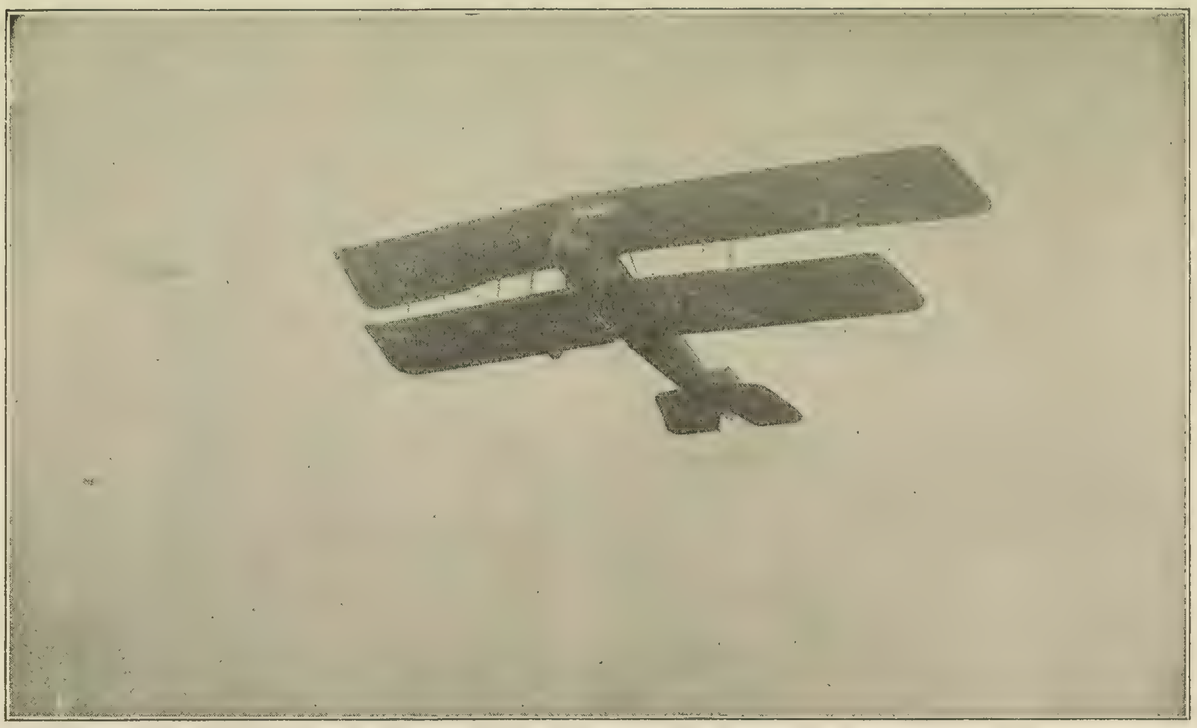
Darts from the Sky at 150 M. P. H. and When Within 50 Ft. of the Surface Discharges Its Torpedo

England had in operation several months before the armistice was signed a "flying torpedoboat," one of the navy's deadliest weapons, which is credited with having a lot to do with causing Germany's abject surrender. The enemy had devised means of successful protection of his naval bases against torpedoboats and submarines, but the latest invention of British air and naval science baffled the Germans.

The efficacy of the weapon may be realized from the following brief details of its operation.

Espying an enemy craft, the flying torpedoboat makes a sudden dive from the clouds at a speed of 150 miles an hour until it is within 50 feet of the surface, when it discharges the torpedo direct at the enemy ship, then rapidly rises and disappears in the clouds. The operation is so swift that the enemy is unable to train his guns. The machines can be launched from land or sea or from the deck of a ship.

When the German fleet surrendered an airplane mother ship, carrying 20 of the new type machines, met the Hun fleet at sea in readiness to sink the German ships if any treachery should be attempted.



MODEL F EQUIPPED WITH LIBERTY 8 CYLINDER ENGINE
First Liberty Engine to Fly

·L·W·F·ENGINEERING·COMPANY·
COLLEGE POINT, N. Y.

MAP MAKING FLIERS CROSS THE CONTINENT

Major A. D. Smith and Squadron Arrive at Mineola

TRIP OF NEARLY 4000 MILES

Details of a Flight Which Started at Rockwell Field and Required Fifty Hours in the Air

From Rockwell Field, San Diego, Cal., to Bolling Field, Washington, via the Southern route, a distance of approximately 4,000 miles in fifty flying hours, is the record of the squadron of four army planes commanded by Major Albert D. Smith. This is an average of about eighty miles per flying hour.

On Tuesday the squadron flew from Washington to Mineola and the fliers attended the dinner of the Manufacturers Aircraft Association at the Waldorf-Astoria, Tuesday.

With the exception of three stretches, covering 520 miles, the entire flight was made against a steady wind, which cut down the speed of the squadron materially.

The measured distance for the trip, taking the direct air line between all points at which stops were made, was 3860 miles. It was not possible to take the direct air line between some points, and the detours made increased the distance covered by approximately 400 miles.

Accompanying Major Smith were Major James H. McKee, flight surgeon; Lieuts. Robert S. Worthington, H. D. McLean, Albert Pyle and John M. Evans, and two mechanics, Sergts. Blanton and Lewis, both master signal electricians.

"We made no attempt whatever to establish a speed record on this trip," said Major Smith. "We started out to map an aerial mail route betyeen San Diego and El Paso, Tex., and were permitted to pick our own course from El Paso on.

"The course to El Paso was carefully mapped and landing places selected. Lieut. Evans is the official photographer of the party, and he took some fine pictures along the route. We also made photographs and notes covering the entire distance.

"We made the entire trip without changing a plane or an engine. The plan is to fly back to San Diego, and a start probably will be made about the middle of this month.

"Out motors have gone through sixty-five hours of actual flying and will be replaced by new motors for the trip home. We expect to use the same planes on the return journey.

"The entire distance from sea to sea and up the coast was covered in formation. For three solid weeks we were compelled to remain idle on account of bad weather."

The squadron left Rockwell Field on Dec. 4 and was on the road thirty-three days, or four weeks and five days.

In 1912 Col. Rogers flew from New York to Los Angeles for the purpose of advertising a certain product. He covered the distance in about forty days. The only other cross-country flight was made by a pilot named Fowler, who flew from Los Angeles to Jacksonville and spent about three months en route. He had a train along with him.

The original squadron contained five planes, but the fifth pilot lost his way on the first lap of the journey. Major Smith modestly gives credit to the junior pilots for the success of the flight, but they insist he is entitled to 90 per cent of it. The planes used were Curtiss J N 4 H.'s fitted with Hispano-Suiza engines.

Object of the Trip

Primarily, the object of the trip was an aerial reconnaissance of air lanes and routes, and to locate and map landing fields across the southern section of the country for similar flights in the future. As such, as well as a great flying stunt, it is regarded as a success. The entire trip was made without particular incident, accident, or changing of machines although many difficulties had to be overcome and extreme cold, and foggy and rainy days were experienced. These difficulties consisted mainly in finding suitable landing fields. At Raleigh, S. C., for instance, the planes had to hover over the city for several hours before a satisfactory landing place could be found, and on a previous occasion they landed in a field so small that there was not enough room for a take-off, and the machines had to be dismantled, carried off the field and re-assembled before the flight could be resumed.

On the other hand, notably at points in Texas, several fields were specially cleared, rolled and finished in anticipation of the arrival of the squadron.

Altogether, twenty-five stops were made en route. Of these twenty were on the flight eastward. They were: Calime, Cal.; Phoenix and Tuxson, Ariz.; Deming, N. M.; El Paso, Marfa, Shumla, Del Rio, San Antonio, and Houston, Tex.; Baton Rouge and New Orleans, La.; Mobile, Montgomery and Eufala, Ala.; Americus, Ga.; Jacksonville, Daytona, Kissimme and Arcadia, Fla.

On the trip northward, the five stopping places were: Daytona, Fla.; Savannah and Tillman, Ga.; Raleigh, S. C., and Petersburg, Va. Arriving at Bolling Field, Major Smith reported about an hour later to the office of the Director of Military Aeronautics.

Major Smith stated that one of the engines was not safe, and Col. M. F. Davis, Chief of the Training Section, gave him another plane for the purpose of continuing the flight to Mineola. The trip was made the following day, the planes leaving Bolling Field at 4:40 p. m.

At Hazelhurst Field it was proposed to have the engines overhauled preparatory to the return trip to California. "This route," Major Smith said, "will be more to the north than the one we followed coming East. The squadron will touch Dayton and then proceed southwest. I certainly would like to go through Oklahoma, and land in my father's alfalfa field near Lamont. I have been interested in airplanes ever since I was fifteen years old and have always wanted to land in my father's field. Now, I may get the chance."

Rockwell Field Fliers in Formation Flight

Photo by Kearny

LIEUT.-COL. H. B. S. BURWELL, COMMANDING OFFICER, ROCKWELL FIELD

To Let Soldiers Keep Uniforms

Favorable report was ordered Jan. 3 by the Senate Military Committee on the House bill permitting soldiers, sailors and marines to retain their uniforms and personal equipment after being discharged from service.

212 AIRPLANES IN SAN DIEGO'S FORMATION

Remarkable Demonstrations by Rockwell Field Fliers

ACROBATICS BY A QUINTET

Both Flights Under the Direction of Col. H. B. S. Burwell, the Commanding Officer

Two airplane demonstrations, either of them probably the greatest in point of numbers of machines engaged ever held in America, have thrilled San Diego, Cal. and the United States Army pilots themselves recently.

Both were given by Rockwell Field, Lieut.-Col. H. B. S. Burwell, commandant, one of the longest established army flying fields in the country, located on North Island in San Diego bay, from which many of the leading aviators of this country have been graduated. The first of these two great demonstrations involved 115 of the army aircraft from Rockwell Field, and was designed by Lieutenant-Colonel Burwell and his staff as a compliment to San Diego in having oversubscribed her quota in the Fourth Liberty Loan several days before the drive closed.

115 Ships in the First Flight

Led by Major Albert Smith, one of America's foremost pilots and instructors, the aerial armada of 115 ships flew over the city, bombers hurling down the remainder of Liberty Loan literature left on hand to inspire greater overscription during the remaining days of the drive.

Photographs of the flight surprised even the participants with evidence showing how well formations had been maintained, and the achievement in that flight resulted, when the armistice had been signed in Europe and peace was in sight, to still greater effort in a commemoration of achievements of American aviators in the world war.

212 Machines in the Second Flight

For this commemoration, Lieutenant-Colonel Burwell ordered all suitable aircraft and skilled pilots prepared. The aerial exercises, as they may be termed, took place November 27, a grand total of 212 airplanes taking part, during two hours of maneuvers.

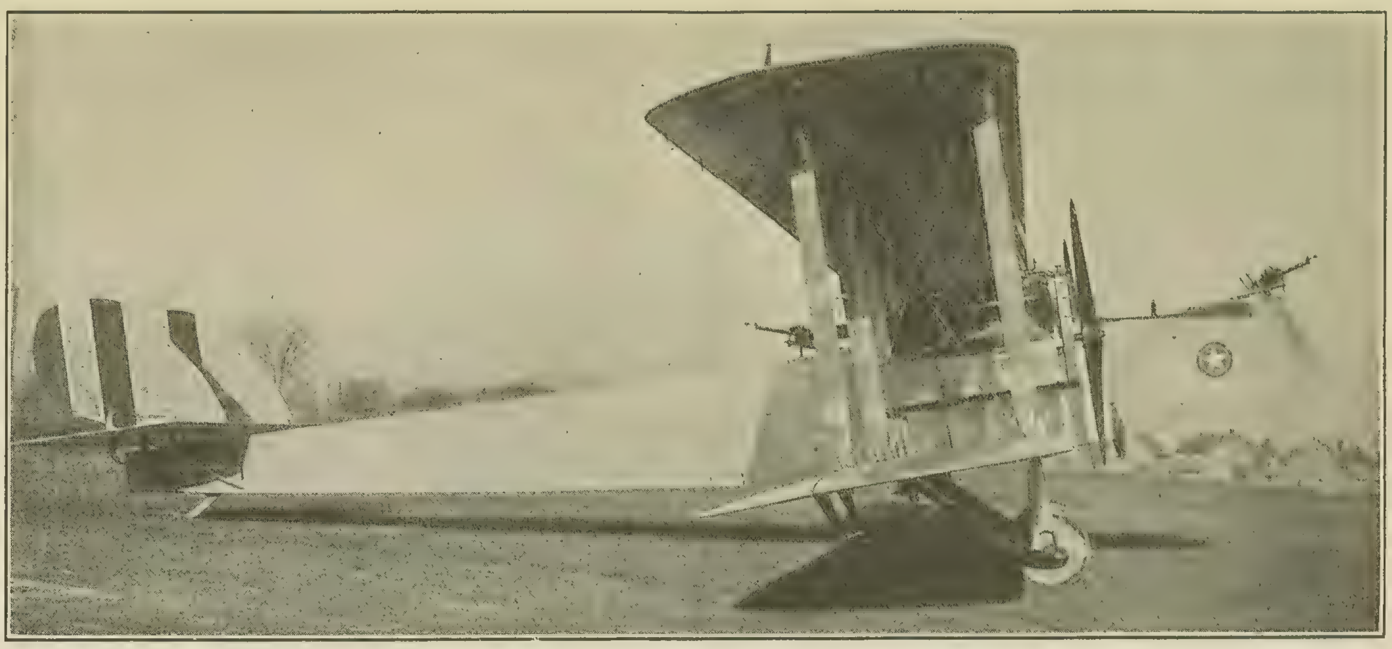
A striking feature of this demonstration was a performance of aerial acrobatics by a picked team of five pursuit pilots "stunting" in unison. This quintet, flying at an altitude of 1500 feet and sometimes less with a background of the mammoth fleet flying in divisions above them, frolicked "up and down" Broadway, looping abreast in unison, gliding back by Immerman turns and exhibiting leaves or vrilles or whatever seemed to suggest themselves, although, in fact, perfectly executed from careful planning.

The Stunt Quintet

The stunt quintet comprised Lieuts. H. H. Bass, W. S. Smith, D. W. Watkins, J. H. Doolittle and H. O. Williams, and were selected for the occasion by competitions held at Ream Field, the acrobatic annex of Rockwell Field. The main fleet, as in the Liberty Loan flight, was led by Major Albert Smith, but this time he piloted an English Spad and, leaving the others in the course of maneuvers, demonstrated its 130-mile speed for the benefit of spectators.

Not a mishap marred either flight. Accomplishments of American aviators and worthiness of equipment were regarded amply proven.

As a monetary equivalent, it is estimated schooling these pilots has cost the United States $6,000,000 and that the aircraft used represented about $2,500,000.



THE MARTIN NIGHT BOMBER

THE MOST IMPORTANT AERIAL DEVELOPMENT OF THE WAR

Officially, it has surpassed the performance of every competitor.

The forerunner of the wonderful

AERIAL FREIGHTER *and* TWELVE PASSENGER AIRPLANE

The skill and ability of the HOUSE OF MARTIN continue to maintain Supremacy of Performance and Dependability which they have held since 1909.

THE GLENN L. MARTIN COMPANY
CLEVELAND

Contractors to the United States Government

CONSTRUCTIVE AIR PROGRAM IS NEEDED

(*Continued from page* 8)

Then a change came over the manufacturers and instead of setting up plans for the manufacture of plow shares and of toys, they devoted their energies to the correction and development of commercial planes, and to my mind, gentlemen, there lies the market of the aircraft manufacturer, and that is the solution of the problem that confronts the aircraft industry. . . .

What the Post Office Department will need is a plane capable of meeting the needs of commerce, and as far as we are concerned we are going to continue to salvage such of the material as the Secretary of War and the Secretary of the Navy will turn over to us, adapting their methods to mail needs. We can just as well do that as to buy new planes built along the old lines.

So today I am satisfied you will have a machine that will not only meet the wants of the Post Office Department, but of commerce generally. It should be a machine that will not have marvelous speed, terrific climb, or great ceiling at the expense of carrying capacity, or stability, or strength of construction.

When you get such a ship—and I don't think it will be very long until you solve those problems—then you will have a machine which will command a market outside of the Government needs, which will be in such demand that all the orders that you get from the War Department or the Navy, or the Post Office Department will pale into insignificance in comparison with what you will get from the commercial world. . . .

You must realize, naturally, that under such conditions the development of the aerial mail is going to be slow, and upon the development of commercial machines, which will be dependable in cross-country work, is going to depend not only the rapidity of the progress of the aerial mail, but of all aviation.

President Russell's Announcement

Before closing I want to make one announcement, namely, that on Feb. 27, and on to March 6, there will be an Aeronautic Exposition, held under the auspices of the Manufacturers' Aircraft Association at Madison Square Garden. We want the help, the aid, the encouragement of every man here tonight to make that show a success, not for ourselves, but for the interest and for the development of the art. Will you help? (Applause.)

Some of Those Present

Among the diners were: Col. W. S. Patterson, Lieut.-Com. R. M. Ream, Major A. C. Moore, Major H. W. Lake, Lieut.-Col. Oscar Westover, Lieut.-Col. L. S. Horner, Lieut. L. Beloni, A. G. Batchelder, Glenn L. Martin, Lieut.-Col. B. T. Castle, L. D. Gardner, Major C. B. Ely, Col. W. E. Gillmore, Col. A. Miller, Col. H. W. Gregg, Lieut.-Col. Chester Goodier, Lieut.-Com. H. Wesson, U. S. N., Lieut.-Com. H. B. Luther, U. S. N., Capt. Robert A. Bartlett, Major James Barnes, Major Howard Wehrle, Lieut.-Com. N. B. Hall, Chas. F. Willard, Lieut.-Col. G. W. Mixter, Lieut.-Col. W. F. Harmon, Dr. Jas. S. Ames, W. Redmond Cross, W. D. Gash, Lieut.-Col. J. S. Sullivan, Col. S. E. Wolf, Major G. R. Wadsworth, E. R. Preston, Willard Seiberling, E. F. Gallaudet, Rodman Wanamaker, C. H. Manley, Glenn H. Curtiss, Com. J. H. Towers, U. S. N., Lieut.-Col. T. E. Gilmore, Col. F. R. Kenney, Col. E. A. Deeds, S. S. Bradley, Murray Hulbert, Brig.-Gen. C. F. Lee, W. S. Saunders, C. H. Day, W. Benton Crisp, Lieut.-Col. H. C. Marmon, Lieut.-Com. F. G. Coburn, U. S. N., Lieut.-Col. J. G. Vincent, H. E. Talbott, Jr., C. F. Clarkson, G. H. Houston, J. P. Tarbox, C. B. Kirkham, H. M. Crane, Caleb S. Bragg, Noble Foss, F. L. Morse, W. T. Thomas, Raymond Ware, B. D. Thomas, A. H. Flint, Com. A. T. Atkins, Col. V. E. Clark, U. S. A., Col. A. C. Downey, Col. T. H. Bane, U. S. A., J. F. Victory, G. C. Loening, C. M. Vought, L. B. Sperry, R. U. Conger, F. G. Diffin, W. B. Stout, S. C. Lewis, C. R. Wittemann, John W. Rapp.

FIGHTERS KILLED AT THE FRONT DURING 1918

(*Continued from page* 11)

Richards, John F., Sept. 26, First Lieutenant, 1st; 4526 Warwick Blvd., Kansas City, Mo.

Roosevelt, Quentin, July 14, First Lieutenant, 95th; Oyster Bay, L. I., N. Y.

Ross, Cleo J., Sept. 26, First Lieutenant, 8th; 302 North Franklin St., Titusville, Penn.

Roth, Irving, Sept. 26, First Lieutenant 49th; 36 E. 7th St., New York City.

Russell, William M., Aug. 11, First Lieutenant, 95th; 917 Jefferson Av., Detroit, Mich.

Rust, Charles E., Oct. 11, Second Lieutenant, 104th; 81 State St., Gallipolis, Ohio.

Sunford, Joseph R., April 12, First Lieutenant; Skowhegan, Me.

Sands, Charles B., Aug 1, First Lieutenant, 27th, 1625 Hanover Av., Richmond, Va.

Shilling, Franz F., July 2, First Lieutenant, 91st, not in office files.

Schone, Harold J., Oct. 30, First Lieutenant, 139th, 5001 College Av., Indianapolis, Ind.

Sebring, Raymond R., Sept. 7, Second Lieutenant, 91st, 139 La Grange St., Morena, Mich.

Siebold, George V., Aug. 26, First Lieutenant, 148th, 756 Rockcreek Church Road, Washington, D. C.

Shaw, Irwin D., July 9, First Lieutenant, 48th R. A. F., 27 Broad St., Sumter, S. C.

Shoemakeer, Harold G., Oct. 5, First Lieutenant, 17th R. A. F., 225 East Commerce St., Bridgetown, N. J.

Simon, Herbert K., Oct. 14, First Lieutenant, 13th; 3007 Jackson St., San Francisco, Cal.

Simpkins, James C., Sept. 18, Second Lieutenant, 125 Brooks St., Missoula, Mont.

Smith, Walter W., Aug. 17, First Lieutenant, 94th; 472 Lexington Av., New York City.

Stephenson, Wayne B., Sept. 13, First Lieutenant, 28th; 2601 Durant Av., Berkeley, Cal.

Stevens, Henry L., Sept. 14, First Lieutenant, 50th, Chachan Plantation, Marcks Corner, S. C.

Stiles, Robert H., Sept. 16, First Lieutenant, 13th; 22 Prospect St., Fitchburg, Mass.

Suiter, Wilbur C., Sept. 13, First Lieutenant, 135th; 927 Orange St., Shamokin, Penn.

Sykes, Don J., Aug. 1, First Lieutenant, 2d; Peedee, N. C.

Taylor, Everett A., Sept. 27, Second Lieutenant, 20th; Cleveland, Okla.

Thomas, Gerald P., Sept. 22, Second Lieutenant, 17th R. A. F.; 259 Broadway, Flushing, L. I., N. Y.

Upton, Charles H., Aug. 28, First Lieutenant, 50th; 27 Harvard St., Arlington Heights, Mass.

Way, Howard P., Sept. 14, Second Lieutenant, 96th; St. David's, Penn.

White, Sidney W., Oct. 31, First Lieutenant, 27th; Elizabeth City, N. C.

Whitney, R. H., March 13, Second Lieutenant; Rock Hill, S. C.

Wicks, Glenn D., Oct. 5, First Lieutenant, 17th R. A. F.; Sauquoit, N. Y.

Wold, Ernest G., Aug. 1, First Lieutenant, 1st; 1779 Emerson St., Minneapolis, Minn.

Wood, Francis A., Sept. 13, Second Lieutenant, 99th R. A. F.; 20 E. 83d St., N. Y. City.

Wooten, James C., Aug. 1, Second Lieutenant, 1st; no address.

Wellers, George H., July 30, First Lieutenant, 20th R. A. F.; 143 E. James St., Lancaster, Penn.

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CHANGES IN THE AIR SERVICE FLYING INSIGNIA

New Designs Adopted Following a Comparison of Ideas

THREE CLASSES AFFECTED

Substitution of Metal for Embroidery Because the Former Has Proved More Serviceable

Material changes in the flying insignia of the Air Service have just been made. The new designs were adopted following a comparison of ideas and a submission of sketches by the General Staff and the Division of Military Aeronautics. They affect the present insignia of Military Aviators, Junior Military Aviators and Reserve Military Aviators, and also of Military Aeronauts, Junior Military Aeronauts, Reserve Military Aeronauts and Observers, and modify Paragraph 36½ of Special Regulations No. 42, Specifications for the Uniform of the United States Army.

Hereafter the device for aviators in the three classes will be the same and will consist of a pair of wings with the shield between, to be made of oxidized silver and to measure 3 inches from tip to tip.

The device for the three classes of aeronauts will also be alike and will have a balloon between a pair of wings, the whole to be made in oxidized silver and to measure 3⅛ inches from tip to tip.

For observers the device will consist of an oxidized silver single wing to the left of the letter "O," which is to be in bright silver and which will encircle the letters "U. S." in oxidized silver in relief on an oxidized silver background. The length of the device will be 1⅞ inches.

In the new aviator's insignia the particular differences from the old designs are that the five-pointed star above the shield, provided in the device for Military Aviators, is eliminated, and that it is to be made entirely of metal instead of being embroidered in silver and gold threads on a blue background.

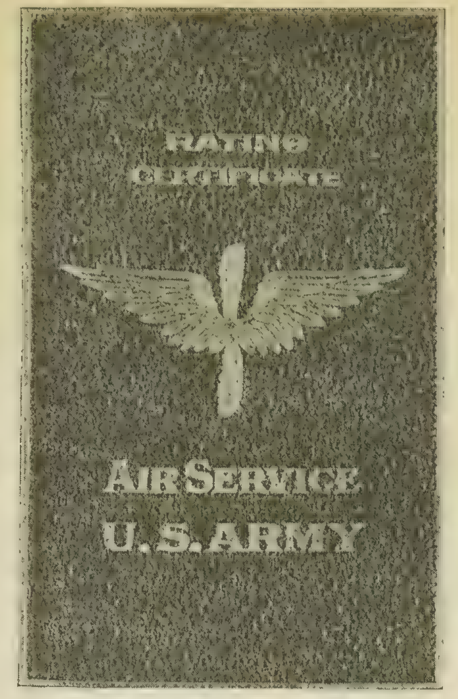
In the case of the new insignia for aeronauts metal also entirely displaces embroidery in white and gold threads on a blue background, while the five-pointed star provided for in the design for Military Aeronauts is also eliminated.

The substitution of metal, also, for an embroidered white and blue design, and the addition of the letters "U. S." within the letter "O," are the changes in the new insignia for observers.

The reason given for the use of metal in place of embroidery is that the latter tarnishes very quickly and is not readily kept clean, while the silver and oxidized silver may be easily brightened and will always be presentable.

To the same Special regulations has been added a new paragraph (39½), which provides an insignia for Air Service flying instructors. This is made in gilt and is of the same design and size as the collar insignia worn by officers, except that the propeller is omitted. In other words, the device consists of two metal wings and is to be worn just above the left cuff on all coats.

This insignia is an award in recognition of the services of those instructors who, prevented from going overseas, "did their bit" in training fliers on the fields in the United States.



Rating Certificate, D. M. A.

New Authorized Flying Insignia

Special regulations authorize oxidized silver flying insignia for Military Aviators, and Junior Military Aviators, and Military Aeronauts and Junior Military Aeronauts. These are similar to previous insignia, but provide for Observers in both branches of the service, an insignia with one wing, and the letter "O," encircling the letters, "U. S."

Flying Instructors of the Air Service are authorized to wear a pair of gilt wings similar to the officers' collar device, without the propeller, on the left sleeve of all coats, just above the cuff.

The instructors' insignia is awarded in appreciation of the services of several hundred fliers who have been kept for use on the flying fields of this country in training the quota of pilots asked of the United States by the Allies.

Shooting of Wild Fowl Forbidden

Destruction of wild fowl is discountenanced by the Division of Military Aeronautics, and hereafter officers of the Air Service, who pursue them in Government airplanes and shoot them with machine guns will be liable to punishment, according to an order just issued by Col. F. R. Kenney, Executive. This order says:

"The shooting of wild fowl with machine guns from airplanes is absolutely forbidden. Airplanes will not be used in any manner for hunting or shooting wild fowl. Airplane flights along the coast, or at any place where migratory wild fowl may be found will be conducted in such a manner as to interfere as little as possible with the habits and feeding of the wild fowl.

"Commanding Officers will use every means to carry out the regulations and will bring to trial any offenders that may in the future be guilty of breaking any of them."

Issuance of the order was promptly made following a civilian complaint calling the attention of the Division to the alleged practice.

Germany Starts Civil Airplanes

Cross-country airplane flights under private control were started at Munich with the probability of air postal service being inaugurated soon. The Bavarian government has lent ten Albatross machines for the experiment. The trip from Munich to Berlin is to be made in four and a half hours and to Cologne in four hours and fifteen minutes. It is planned to put into service an airplane carrying from thirty to forty persons.

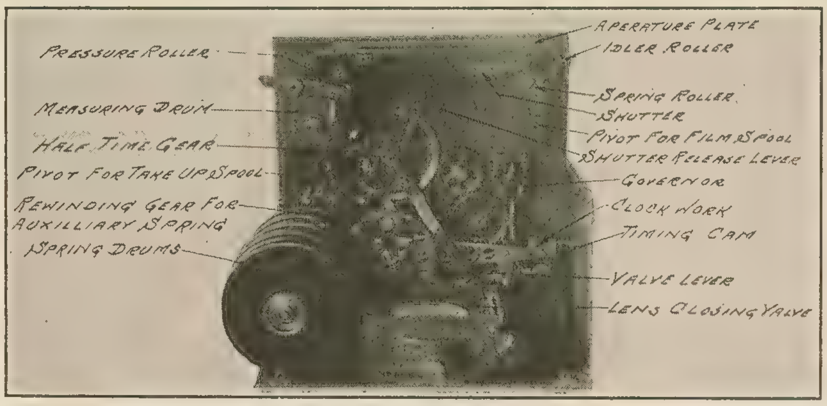
AVIATION PHOTOGRAPHIC EQUIPMENT

ENLARGING MACHINES

SCALE MAP PRINTING MACHINES

SPECIAL MAP DRAWING INSTRUMENTS

FIELD DARK ROOM (COLLAPSIBLE)



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Air Service Clubs Association News

Prior to severing his connections with the Air Service, John D. Ryan issued a statement, in which he commended the formation of the Air Service Clubs' Association and pointed out the benefits which the organization offers not only through local branches, but also by its intended international affiliations. Mr. Ryan, who was elected chairman of the Association's Board of Control, wrote:

"The Air Service Clubs' Association promises to accomplish much for the Air Service and should bring the personnel of the Service into closer relationship, professionally and socially.

"Opportunities are offered members through local clubs in the United States and through the co-operation of the association with Air Service organizations in other countries that should result in great benefit to the members, and I believe will result in a permanent association of international scope, which I consider to be highly desirable."

As one result of the membership campaign now being conducted by the Association, forty-one officers at the Air Service Armorers' School, Fairfield, Ohio, have been added to the membership roll.

A. S. C. Association Smoker Jan. 10

It is announced that the program of the Air Service Clubs Association's smoker on Jan. 10 will include brief talks by Major Gen. Charles T. Mencher, recently appointed as Director of the Air Service; Major Gen. W. L. Kenly, Director of Military Aeronautics; and the American aces, Lieutenant Colonel Thaw, Major Biddle and Capt. Douglass Campbell.

Mills Crashes on Christmas "Bullet"

Cuthbert Mills, an aviator in the United States Air Mail Service, was instantly killed two miles north of Rockville Centre, L. I. Dec. 30 when the Christmas "Bullet" he was operating collapsed.

He was flying at an altitude of 3000 feet when a wing of his plane, one of the fastest in America, dropped off. E. J. Jennings over whose property Mills was circling at the time, noticed the young man apparently had kept his composure and was bringing down his plane on an even keel, although circling in small turns.

Just before he was ready to land his car struck a tall chestnut tree, finally hit the ground and skidded toward the home of Queen Porsert, several hundred yards away. As it struck the earth there was a loud explosion and the plane broke into flames.

When the blaze had burned itself out Mills was dead. A call was sent to Hazelhurst Field for an ambulance. Its driver recognized the machine as belonging to Dr. William W. Christmas of Amityville, its inventor. Dr. Christmas said Mills had intended to circle the Woolworth Building and to fly over the warships in the North River later in the week.

Mills attended the Staten Island Academy and later graduated from Cornell. He spent most of his time after that in travelling around the world with his mother, the widow of Cuthbert Mills, a Wall Street broker, who died several years ago.

The young man graduated from the Curtiss Aviation School in 1912 and had been a pilot and flying instructor in various parts of the country. It is said he had driven the "bullet" at 175 miles an hour. He returned to the Mineola field only recently.

Two Long Flights By Naval Aviators

Two long flights were made by naval aviators on the last day of the year.

One of the flights totalled more than 900 miles in one day. It was made by Lieut. T. C. Rodman, U. S. Marine Corps, on Dec. 30, at Pensacola, Fla., with eleven passengers. The other flight was made by the veteran naval aviator, Lieut. Commander Bellinger, U. S. N., who covered a distance of 651 miles without stopping, with five passengers besides himself.

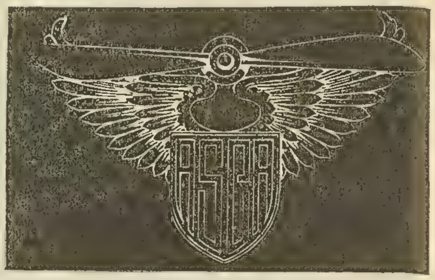
Both flights were in competition for the Curtiss Marine Flying Trophy and a $1000 cash prize, which ended on Dec. 31 with Lieut. Rodman the winner of the prize and the Aero Club of America as winner of the trophy.

J. L. Cato to Design and Build

J. L. Cato, formerly experimental engineer of the L. W. F. Engineering Company and who was in charge of all the developing work for that company, has accepted a position with Marlin-Rockwell Corporation to develop a new all ball bearing aeronautical motor to power a sporting type of monoplane of his own design. Mr. Cato's interest in aeronautics dates back to 1909, and his long experience with aeronautical motors and planes puts him in a position to develop a very popular type of sporting plane.

Official Insignia of A. S. C. Association

An official insignia has been adopted by the Air Service Clubs' Association and is shown in the accompanying illustration. As a badge of membership it will be made in the form of a button. It will also be used on the Association's stationery.



Design for Button and Stationery

The design shows a conventional pair of wings, above which is a propeller, placed horizontally, and below which is a shield bearing the club's monogram.

Cols. Henry H. Arnold and G. H. Crabtree and Lieut.-Col. B. F. Castle are members of a committee appointed to consider and report upon what activities should be adopted for making and preserving records of aeronautical achievements.

Says All Mail Will Go By Air

All mails between Europe and the United States eventually will be carried by airplane, according to Lord Norris, who has championed a movement before a parliamentary committee for the establishment of a port of call for Atlantic liners on the west coast of Ireland.

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By

LIEUTENANT ALEXANDER KLEMIN

Air Service, Aircraft Production, U. S. A., in Charge Aeronautical Research Department, Airplane Engineering Department. Until entering military service in the Department of Aeronautics, Massachusetts Institute of Technology, and Technical Editor of *Aviation and Aeronautical Engineering.* In two parts.

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U. S. TAX ON AIR TRAVELERS AND FREIGHT?

May Come Under Section 500 of the New Revenue Bill

SIMILAR TO OTHER LINES

Imposts on All Carriers Who Operate by Any Form of Mechanical Power When in Competition

By Section 500 of the Revenue Bill, which has been passed by both Houses of Congress, and sent to conference on amendments made in the Senate, a tax is to be levied for the transportation of property and persons by any form of mechanical power. This tax is based on the cost, and is 3 and 1 per cent for domestic transportation of freight and persons, respectively; 3 per cent and 1 cent on each 20 cents for foreign transportation of freight and persons, respectively, and 8 per cent for the transportation of persons on a regularly established line. The taxes of 1 and 8 per cent are to be paid on competitive lines. These provisions are found in paragraphs a, b, and c, which read as follows:

"Any Form of Mechanical Motor-Power"

"(a) A tax equivalent to 3 per centum of the amount paid for the transportation on or after such date, by rail or water or by any form of mechanical motor power when in competition with carriers by rail or water, of property by freight transported from one point in the United States to another; and a like tax on the amount paid for such transportation within the United States of property transported from a point without the United States to a point within the United States;

"(b) A tax of 1 cent for each 20 cents or fraction thereof of the amount paid to any person for the transportation on or after such date, by rail or water or by any form of mechanical motor power when in competition with express by rail or water, of any package, parcel, or shipment, by express, transported from one point in the United States to another; and a like tax on the amount paid for such transportation within the United States of property transported from a point without the United States to a point within the United States;

"(c) A tax equivalent to 8 per centum of the amount paid for the transportation on or after such date of persons by rail or water, or by any form of mechanical motor power on a regular established line when in competition with carriers by rail or water, from one point in the United States to another or to any point in Canada or Mexico, where the ticket or order therefor is sold or issued in the United States, not including the amount paid for commutation or season tickets for trips less than thirty miles, or for transportation the fare for which does not exceed 42 cents

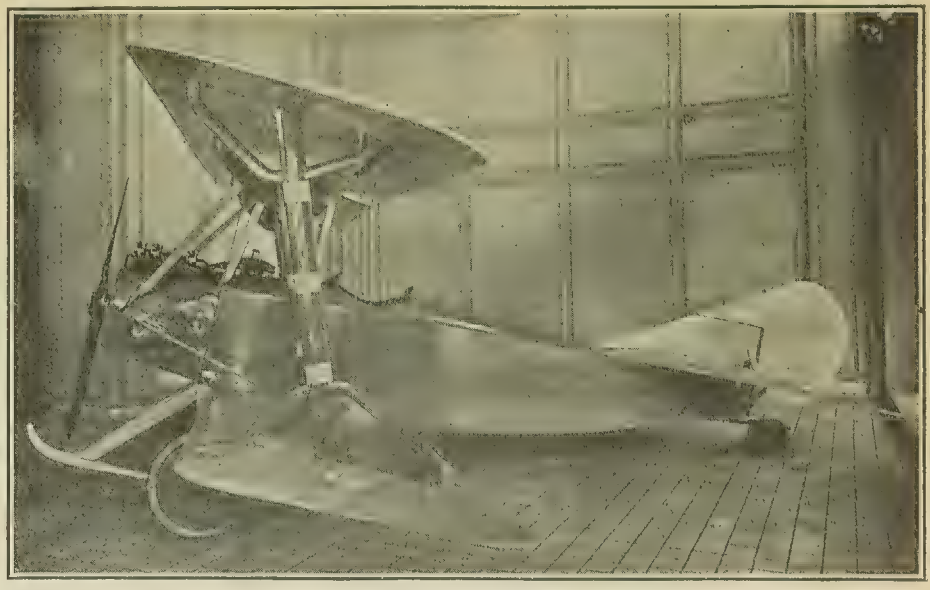
"*Provided, That where such transportation lines are in competition with foreign lines the tax imposed under this paragraph shall not exceed the amount of transportation tax to which such foreign transportation company is subjected by its Government corresponding to this tax.*"

Takes Effect April 1 Next

Since the close of the war, several announcements have been made of the proposed establishment of airplane lines for carrying both freight and passengers, and other similar announcements are likely to follow particularly if the first experiments prove to be financially successful. Whether or not Congress had aircraft in mind when making these provisions, transportation by airplanes may come within the meaning of the phrase, "by any form of mechanical motor power."

In this event, whether an airplane route is established to carry on a transportation business wholly within this country, or partly within and partly without, or whether of persons or packages or both, or whether with or without competition, it would seem that the operators, or in the last analysis the traveler or shipper, will have to pay some form of tax just the same as a railroad or steamship company.

It is, therefore, possible that during the current year we shall witness for the first time the novelty not only of the operation of airplane passenger and freight traffic in various parts of the country, but also of the Federal Government swelling its revenue by collecting excise taxes on the business done.



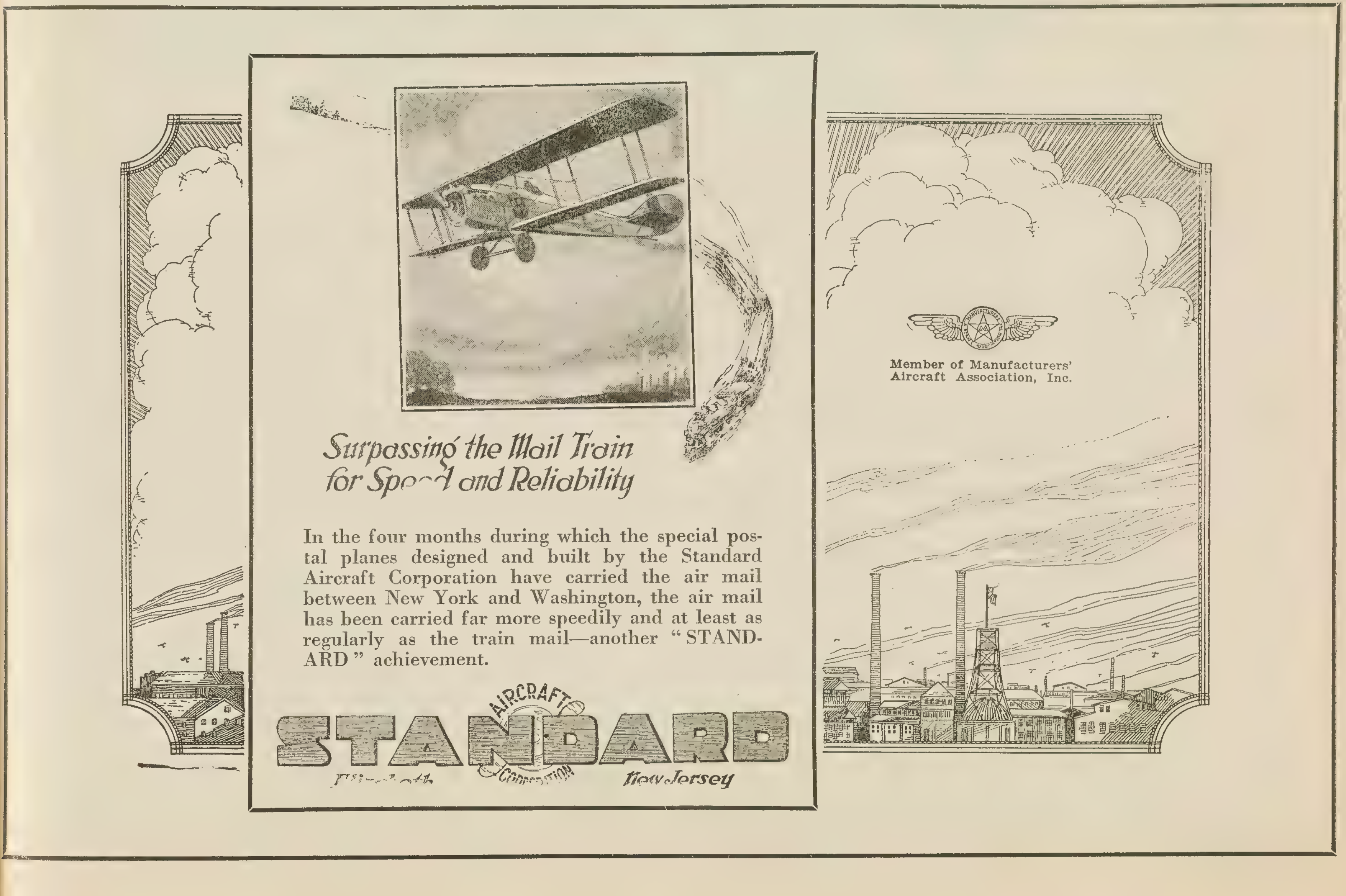
Selling Custom Made Airplanes

The Aircraft Engineering Company of New York is displaying custom made airplanes for sale just as standard makes of automobiles are sold. Thousands of persons viewed the machine showed above, and the manufacturers report that many sales were made. It was on exhibit last week at the show room of the Willys-Overland Company in New York City.

B. Russell Shaw's New Office

B. Russell Shaw, having been released from Government service at McCook Field, where he was in charge of testing American and foreign machines, has opened a consulting office at 32 East 23rd Street, New York City.

Mr. Shaw is one of the best known aeronautical engineers in the country, having been at various times connected with the old Wright-Martin Company, and other pioneer organizations of the industry.



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DISCHARGE OF OFFICERS IS PROCEEDING

Separated from the Service as Rapidly as Possible

PUBLIC INTERESTS SERVED

Conditions Under Which Resignations Submitted by Officers May Be Considered

The following is a copy of a circular in regard to the discharge of officers from the Army, which has been issued by the War Department:

1. The President has determined, under the provisions of Section9, Act of Congress approved May 18, 1917, that the public service will be promoted by the discharge, as rapidly as their services can be spared, of officers in the United States Army, except those holding commissions of any kind in the Regular Army.

2. Department commanders, commanders of camps not under the jurisdiciton of department commanders or of chiefs of bureaus of the War Department, commanders of ports of embarkation, all chiefs of staff corps and departments, including the Chief of Field Artillery and the Chief of Coast Artillery, are authorized and directed to discharge such officers of the line and staff as are under their command as rapidly as circumstances permit.

According to Law

3. All separations from the service will be by discharge as authorized by law; tenders of resignation will not be received nor considered. (*See last two paragraphs of this article.—Ed.*) Such discharges will be a complete separation of the individual from the military service and will terminate all commissions held by him in the Officers' Reserve Corps or otherwise. All officers should be so informed and should also be informed that, while they are given opportunity to express their desires relative to commission in the Reserve Corps or the Regular Army, the granting of such commissions will be entirely depeudent upon their fitness, eligibility and such vacancies as may be provided by existing or future laws and regulations.

4. Orders received directing the reduction of the enlisted strength of a command will be construed as requiring a corresponding reduction of commissioned strength in the manner provided by these instructions. For the purpose of determining the order of discharge, officers will be arranged into the following classes and discharged in this order:

Officers Arranged in Classes

First—Officers desiring full and immediate separation from the service.

Second—Officers desiring prompt separation from the service and subsequent appointment or reappointment in the Officers' Reserve Corps and whom commanding officers recommend for such appointment.

Third—Officers desiring appointment, if opportunity permits, in the Regular Army and whom commanding officers recommend for such appointment.

5. The following officers will not be discharged under provisions of these instructions:

a Officers holding commissions in the Regular Army, either on the active list or retired list.

b Officers in arrest, under charges, or serving sentence of a general court-martial.

c Officers having had money or property accountability and who have not a clearance therefor.

d Officers on sick report or in hospital.

e Officers who for exceptional reasons cannot be spared or who, in the opinion of the commanding officer, should not be discharged at this time.

Officers of the classes *b*, *c*, *d* and *e* may be discharged when no longer in the status stated.

Records Submitted

6. For each officer discharged under these instructions there will be prepared and forwarded to the Adjutant General of the Army such records as are prescribed in Circular No. 73, War Department, 1918. In addition to the records and reports required therein a report on Form 150-CPB-GS will be sent separately by registered mail to the Adjutant General of the Army. A copy of this form is being distributed. It will be reproduced locally in sufficient quantity to meet all requirements and will be completed in all respects before forwarding.

7. In addition to the reports required by Circular No. 73 and by paragraph 6 of these instructions, a telegraphic report will be sent daily to the Adjutant General of the Army, Attention Room 325, giving the following information: The number of officers of each arm or corps by grades discharged that day under provisions of this circular. Also a list, giving the full name, rank, organization, arm, staff corps or department of each officer discharged that day, will be sent daily by registered mail to the Adjutant General of the Army, Attention Commissioned Personnel Branch.

Form of Discharge Order

8. The following form of order will be used in discharging officers under these instructions:

"By direction of the President, and under the provisions of Section 9, Act of Congress, May 18, 1917, and Circular No. 75, War Department, 1918, Capt. John Doe, Infantry, is honorably discharged from the service of the United States, for the convenience of the Government, to take effect this date, his services being no longer required."

9. It is the intention to issue Reserve Corps commissions in general to those officers who have served with credit to thmeslves during the war and who desire such commissions. Care should be exercised, therefore, in the entries and recommendations on Form 150-CPB-GS to insure justice to the individual and to the Government. In case they desire to do so applicants for commission in the Reserve Corps or Regular Army will be permitted to append to Form 150-CPE-GS copies of lettrs from military superiors setting forth specially meritorious service or action.

References to Be Consulted

10. In connection with these discharges attention is directed to the following:

a Section 9, Act of May 18, 1917. (See page 11, Bulletin No. 32, War Department, 1917.)

b Sixth paragraph, Section 37, Act of June 3, 1916. (See page 59, Special Regulations No. 43.)

c Act of March 2, 1901, relative to travel allowances. (See paragraph 684, Military Laws of the United States, 1915.)

d Act of March 30, 1918, relative to restoration of enlisted men to former grades. (See Section V, Bulletin No. 22, War Department, 1918.)

e Memorandum of Judge Advocate General, August 30, 1917. (See paragraphs 3, 4 and 5, page 22, Bulletin No. 72, War Department, 1917.)

f Opinion of the Judge Advocate General, 241.5, March 30, 1918. (See page 23, Digest of Opinions, March, 1918.)

Circular Order Changed

In a circular issued by the War Department on November 27 in regard to the discharge of officers from the Army, it is announced that in the second line of paragraph 3 of Circular 75, W. D., 1918, the words "tender of resignation will not be received nor considered" have been struck out, and the following has been added:

"Resignations submitted by officers may be considered when the officer's commanding officer or the chief of the staff corps concerned states that the services of the officer can be spared. In such cases the officer will be discharged by his commanding officer or the chief of the staff corps as provided in this circular. Attention is directed to paragraph 3, Circular No. 73, War Department, 1918, and Circular No. 85, War Department, 1918."

Assignments of A. S. (P) Officers

Officers in the Bureau of Aircraft Production have been assigned to new or additional duties as follows:

Lieut. Col. R. M. Jones as Assistant and Executive to the Acting Director, in addition to his duties as Executive Officer of the Bureau.

Lieut. Col. H. C. Clark as adviser and assistant to the Acting Director on matters pertaining to the personnel in addition to his duties as Chief of the Personnel Department.

Lieut. Col. O. Westover as assistant to the Acting Director. Lieutenant Colonel Westover was formerly Chief of the Storage and Traffic Department.

Major George F. Lyons as assistant to the Acting Director.

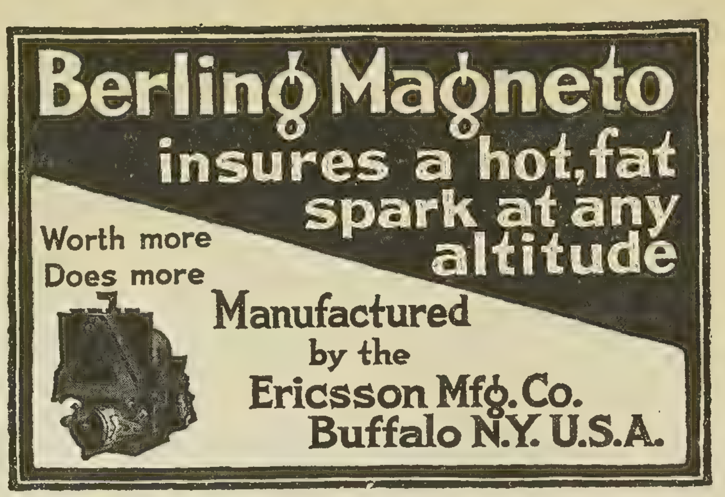
Construction Abandoned

Abandonment orders have been issued by the Construction Division, War Department, on the following projects:

Construction of a training school for officers and enlisted specialists at Fort Monroe, Va., and the establishment of officers' training schools at Camps Gordon and Hancock.

All construction work at North Camp Jackson except in connection with the tent camp to provide accommodations for two artillery brigades.

Liberty theatres and extensions to existing theatres at Camps Bragg, North Jackson and Knox.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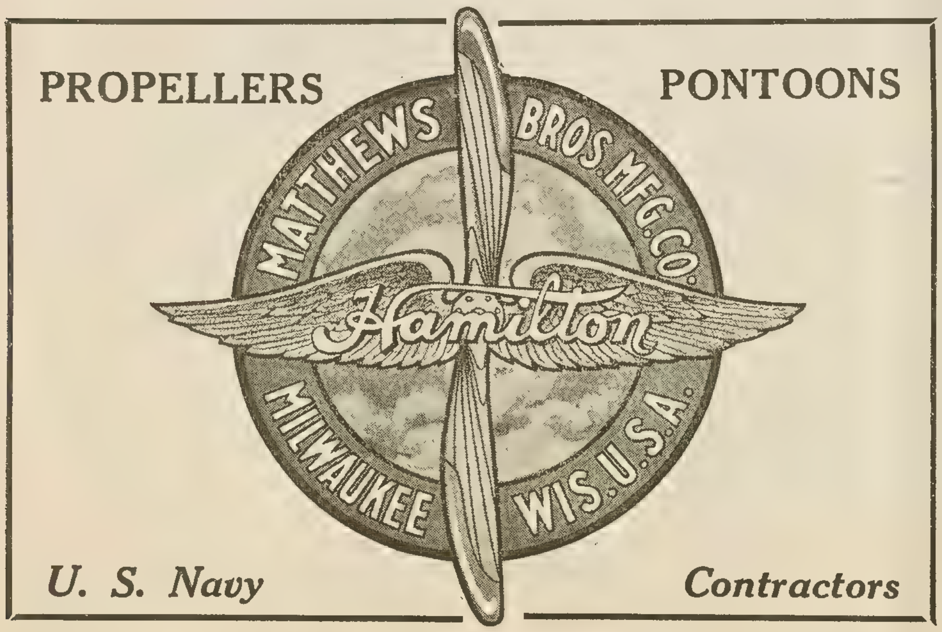

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Measures Now Before the Senate

In the course of the consideration of the Revenue Bill (H. R. 12863) in the Senate on Dec. 23, an amendment proposed by Senator Trammell of Florida was adopted granting one month's extra pay to all honorably discharged officers and enlisted personnel of the Army, Navy and Marine Corps.

The application of the amendment is limited to discharges since Nov. 11, and in answer to questions Senator Trammell explained that the object was to make it apply only to men who had served until the conclusion of actual hostilities; that why the claims of those who were discharged prior to that date, by reason of wounds or illness, and were not recognized as just or meritorious, was because the line had to be drawn somewhere, and because such men had been discharged at their own request unless they were discharged for disability, and that it would apply equally whether their service was only for a few months, weeks or days prior to the signing of the armistice, or for a longer time.

In urging the adoption of his amendment, Senator Trammell described the allowance as "a little pittance to assist them in going home and getting once more re-established in civil life." He also referred to a bill to the same effect as the amendment, which he had introduced several weeks before, and stated that the policy had been approved by Gen. March in a public interview.

Senator Chamberlain explained that there are various bills covering extra pay, uniforms and other gratuities, pending before the Committee on Military Affairs, of which he is chairman, and that the Trammell bill had been acted upon favorably by the committee, but had not been reported to the Senate because it and all similar bills had been sent to the War Department with the request that they be reconciled and reported upon as to the propriety of the committee reporting them as they are, or that such changes be made as will unify the law and harmonize the different statutes. He also said that the committee considered the principle worthy of acceptance.

Senator Ashurst stated that he had been assured by the chairman of the Committee on Military Affairs that the bill (13366) which authorized the giving to soldiers, sailors and marines their uniforms, overcoats and other apparel, and which passed the House on Dec. 16, would undoubtedly be passed by the Senate at an early date. The Senator also said that he had received over a thousand letters endorsing the bill which he had introduced, granting three months' pay and also uniforms, etc. He read fourteen of them into the record.

$26,466,074 Supplies Sold by Air Service

In accordance with the provisions of the act of July 9, 1918, the Secretary of War has transmitted to the House of Representatives a report of the sale of war supplies up to Dec. 2. The total sales reported amount to $123,245,239.57, of which $26,451,114.95 were made by the Bureau of Aircraft Production, and $14,959.95 by the Division of Military Aeronautics.

Sales by the Bureau of Aircraft Production were made up of the following named articles: Miscellaneous supplies, hangars and erection, to the Post Office Department for use of the Air Mail Service, $76,175.73; six Hispano-Suiza engines to the Standard Airplane Co. for use on mail planes, $25,479.36; two Hall-Scott engines to the Standard Aircraft Corp., for use on planes sold to the Brazilian Government, $4,982.13; lumber, $1,655,805.16; airplane fabric, $1,204,376.07; engines, $18,534,025.55; complete airplanes, $2,978,658.77, and miscellaneous airplane parts and equipment, $1,901,010.54, all to the United States Navy; and miscellaneous scrap and surplus supplies to various manufacturers and dealers, $70,601.64.

Items sold by the Division of Military Aeronautics were: Gauntlets to the United States Navy for the use of naval aviators, $7,700.

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Personals

Major Cushman A. Rice, Air Service, has been granted a sick leave of two months from Dec. 30. Major Rice enlisted in the Air Service in June, 1917, and went to England in January following as commander of an American Provisional Aviation Brigade, and then with four American squadrons to France, where he was made inspector and commander of all American units brigaded with the British on the front and in England. He returned to the United States last June. Previous to his experience in the Air Service, Major Rice had served in the Spanish-American war and as a volunteer in the armies of Venezuela, Honduras, Nicaragua and China.

Major Ferdinand G. Angeny, M. C., has been transferred from the Air Service Flying School at Park Field to the Air Service Depot, Garden City, N. Y., for duty.

Miss Marjorie Gilbert Smith, daughter of Mr. and Mrs. Alfred Gilbert Smith, was married Jan. 1 to Lieut. Graham Manville Brush, U. S. N., A. C., son of Edward Brush of Greenwich, Conn.

The ceremony took place at 4 o'clock in Christ Episcopal Church, Greenwich, Conn. Miss Katherine Smith was her sister's maid of honor.

Lieut. Anthony Bullock, U. S. N., was best man, and the ushers were Lieut. William Rockefeller, U. S. N., A. C., of Greenwich; Lieut. Wallace Hoggson, U. S. N., A. C., of New York; Lieut. Wallace Clark, U. S. N., of New Orleans; Ensign S. R. Swenson, U. S. N., A. C., of New York; Lieut. Walter Jacob, U. S. N., A. C., of Watertown, and Lieut. Henry Nayor, U. S. N., A. C., of Washington.

Major C. F. Cook is detailed from the Infantry to duty in the Finance Division, Bureau of Aircraft Production.

Capt. Isaac H. Saunders, A. S., A., is relieved as president of the Aviation Examining Board, Cincinnati, Ohio, and ordered to Washington, D. C., to report to the Director of Military Aeronautics for duty.

Lieut.-Col. Claude K. Rhinehardt, A. S., A., is ordered from Hoboken, N. J., to Washington, D. C., to report to the Director of Military Aeronautics for duty. Lieutenant-Colonel Rhinehardt was Commanding Officer of the First Provisional Wing, Mineola, N. Y., until sent overseas.

Lieut.-Col. William F. Pearson has been relieved from the command of the Aviation General Supply Depot, San Antonio, Tex., and ordered to report in person to the Director of Military Aeronautics for duty.

Major Karl H. Gorman, stationed at the Air Service Depot, Garden City, N. Y., is ordered to report in person to the Director of Military Aeronautics at Washington, D. C., for duty.

Major Leon T. LeWald, M. C., is ordered from the Cornell Medical School, New York City, to duty in the Medical Research Laboratory at Hazelhurst Field.

Capt. Henry A. Horne, attached to the Bureau of Aircraft Production, Washington, D. C., has been appointed district manager, Aircraft Finance, Dayton, O.

Major Attilio M. Caccini, M. C., stationed at Camp Greene, is assigned to the Air Service, Aeronautics, and ordered to the Air Service Depot, Garden City, N. Y., for duty.

Capt. Thomas Walkup, A. S., A., is relieved as president of the Aviation Examining Board, St. Louis, Mo., and ordered to report in person to the Director of Military Aeronautics, Washington, D. C., for duty.

Majors George E. A. Hallett, S. C., and Rudolph W. Schroeder, A. S., A., have been ordered from Wright Field to McCook Field for duty.

Major Frank A. Johnston, M. C., is transferred from the Medical Research Laboratory at Hazelhurst Field to the Air Service Flying School, same place, for duty.

Col. William N. Hensley, Jr., A. S. A., is rated as junior military aviator, to date from Dec. 11, 1918. Colonel Hensley was recently appointed Supervisor of the Southwestern Supervisory District of the Air Service.

Major Vernon K. Earthman, M. C., is relieved from duty at the Aviation Mobilization Depot, Camp Dick, upon the abandonment of that camp, and is ordered to duty at the Air Service Flying School, Love Field.

Lieut. Col. Wm. Thaw, A. S., A., arrived in New York City from Pittsburgh on Jan. 4.

With the approval of the Secretary of War, the Chief of Staff has recommended that the Distinguished Service Medal be awarded to Maj. Gen. George W. Goethals "for especially meritorious and conspicuous service in reorganizing the Quartermaster Department and in organizing and administering the Division of Purchase, Storage and Traffic during the war." This citation is a brief but deserved tribute to the well-known executive ability of the "Builder of the Panama Canal" and the president of the Wright-Martin Aircraft Corporation.

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First Lieut. Arthur E. Easterbrook, Observer

Arthur E. Easterbrook, first lieutenant, observer, 1st Aero Squadron. For extraordinary heroism in action near St. Mihiel, France, Sept. 12, 1918. Because of intense aerial activity on the opening day of the St. Mihiel offensive, Lieut. Easterbrook, observer, and Second Lieut. Ralph E. de Castro, pilot, volunteered to fly over the enemy's lines on a photographic mission without the usual protection of accompanying battle planes. Notwithstanding the low-hanging clouds, which necessitated operation at an altitude of only 400 meters, they penetrated 4 kilometers beyond the German lines. Attacked by four enemy machines, they fought off their foes, completed their photographic mission, and returned safely.

First Lieut. William P. Erwin, A. S.

William P. Erwin, first lieutenant, A. S. S. R. C., Air Service, 1st Aero Squadron. For extraordinary heroism in action in the Chateau-Thierry and St. Mihiel salients, France. Lieut. Erwin, with Second Lieut. Byrne E. Baucom, observer, by a long period of faithful and heroic operations, set an inspiring example of courage and devotion to duty to his entire squadron. Throughout the Chateau-Thierry actions, in June and July, 1918, he flew under the worst weather conditions and successfully carried out his missions in the face of heavy odds. In the St. Mihiel sector, Sept. 12 to 15, 1918, he repeated his previous courageous work. He flew as low as 50 feet from the ground behind the enemy's lines, harassing German troops with machine-gun fire and subjecting himself to attack from ground batteries, machine guns and rifles. He twice drove off enemy planes which were attempting to destroy an American observation balloon. On Sept. 12 and 13, 1918, he flew at extremely low altitudes and carried out infantry contact patrols successfully. Again on Sept. 12 he attacked a German battery, forced the crew to abandon it, shot off his horse a German officer who was trying to escape, drove the cannoneers to their dugouts, and kept them there until the infantry could come up and capture them.

Second Lieut. Ralph E. de Castro, Pilot

Ralph Ellison de Castro, second lieutenant, pilot, 1st Aero Squadron. For extraordinary heroism in action near St. Mihiel, France, Sept. 12, 1918. Because of intense aerial activity on the opening day of the St. Mihiel offensive, Lieut. de Castro, pilot, and First Lieut. Arthur E. Easterbrook, observer, volunteered to fly over the enemy's lines on a photographic mission, without the usual protection of accompanying battle planes. Notwithstanding low-hanging clouds, which necessitate operation at an altitude of only 400 meters, they penetrated 4 kilometers beyond the German lines. Attacked by four enemy machines, they fought their foes, completed their photographic mission, and returned safely.

First Lieut. James A. Healy, A. S.

First Lieut. James A. Healy, Air Service, 147th Aero Squadron. For extraordinary heroism in action near Grandpre, France, Oct. 30, 1918. Becoming separated from his patrol, Lieutenant Healy, flying at an altitude of 600 meters, discovered an enemy plane (type Halberstadt) hiding in the sun [illegible]00 meters above him, which he attacked and sent to the ground in a spiral dive. He then engaged two other machines (type Fokker) which had been attempting to attack him. He succeeded in outmaneuvering them, and finally shot down one of the Fokkers. He returned without a drop of gasoline in his tank. Home address, Mrs. Mary Healey, mother, 361 Union Street, Jersey City, N. J.

First Lieut. Murray K. Guthrie, A. S.

First Lieut. Murray K. Guthrie, Air Service, 13th Aero Squadron. For extraordinary heroism in action near Andsvanne, France, Oct. 1, 1918. Lieutenant Guthrie was a member of an offensive patrol of four planes, which was attacked far behind the enemy's lines by six German machines. One of our pilots was forced to withdraw by the failure of his machine guns, and two others were surrounded and overpowered. Lieutenant Guthrie fought the six enemy planes alone for ten minutes and destroyed one of them.

For the following act of extraordinary heroism in action near Montefaucon, France, Oct. 4, 1918, Lieutenant Guthrie is awarded one bar: When the leader of his patrol was blown to pieces by a shell, Lieutenant Guthrie took command and attacked the formation of six enemy planes. Although he became separated from his companions, he succeeded in destroying one of his opponents.

ONE BAR

For the following act of extraordinary heroism in action near Fontaine, France, Nov. 4, 1918. Lieutenant Guthrie is awarded one bar; as flight commander, Lieutenant Guthrie led his formation of six planes to the attack of seven enemy planes (type Fokker), six of the enemy were destroyed, one of which was sent down by this officer. Immediately following this combat he attacked and drove off four hostile machines (type Fokker), which were about to attack one of our balloons. Home address, K. R. Guthrie, father, care of A. T. & N. Railway, Mobile, Ala.

First Lieut. Lloyd A. Hamilton, A. S.

First Lieut. Lloyd A. Hamilton (deceased), 17th Aero Squadron. For extraordinary heroism in action at Varssenuere, Belgium, Aug. 13, 1918. Leading a low bombing attack on a German aerodrome 30 miles behind the line, Lieutenant Hamilton destroyed the hangars on the north side of the aerodrome and then attacked a row of enemy machines, flying as low as twenty feet from the ground despite intense machine-gun fire, and setting fire to three of the German planes. He then turned and fired bursts through the windows of the chateau in which the German pilots were quartered, twenty-six of whom were afterward reported killed. Next of kin, Rev. John A. Hamilton, father, 25 Buell Street, Burlington, Vt.

First Lieut. Louis G. Bernheimer, Pilot, A. S.

First Lieut. Louis G. Bernheimer, Air Service, pilot, 88th Aero Squadron. For the following act of extraordinary heroism in action near Tailley, France, Nov. 2, 1918: Lieutenant Bernheimer and First Lieut. Ralph P. Bagby, observer, on their own initiative went on a reconnaissance mission, flying fifteen kilometers behind the German lines, securing valuable information on the condition of the bridges across the Meuse River and enemy activity in the back areas and harassing enemy troops. Home address, Sidney Bernheimer, father, 138 East Seventy-second Street, New York City.

First Lieut. Stirling C. Alexander

First Lieut. Stirling Campbell Alexander, pilot, Air Service, 99th Aero Squadron. For extraordinary heroism in action in the region of Landres-et-St. Georges, France, Oct. 6, 1918. Lieutenant Alexander, with Lieutenant Atwater, observer, on a photographic mission, was forced back by seven enemy pursuit planes. A few minutes later he returned over the lines, and while deep in enemy territory was cut off by twelve enemy planes (Pfals Scouts). He maneuvered his plane to give battle, and so effectively managed the machine that he with his observer were able to destroy one, and forced the others to withdraw. With his observer severely wounded, he managed to bring his plane safely back to his own aerodrome, with his mission completed. Home address, Mrs. Lucine Hughe Alexander (mother), Chestnut Hill, Philadelphia, Pa.

First Lieut. Harold R. Buckley

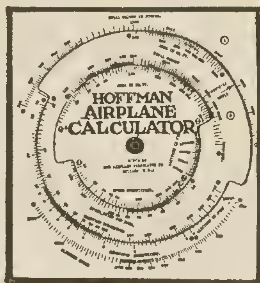
First Lieut. Harold R. Buckley, pilot, Air Service, 95th Squadron. For extraordinary heroism in action near Perle, France, Aug. 10, 1918. Lieutenant Buckley was on a patrol protecting a French biplane observation machine, when they were suddenly set upon by six enemy planes. Lieutenant Buckley attacked and destroyed the nearest, and the remainder fled into their own territory. He then carried on with his mission until he had escorted the Allied plane safely to its own aerodrome.

BRONZE OAK LEAF

A bronze oak leaf, for extraordinary heroism in action near Neville, France, and Bourcuilles, France, Sept. 16-27, 1918. Lieutenant Buckley dived through a violent and heavy anti-aircraft and machine-gun fire and set on fire an enemy balloon that was being lowered to its nest. On the next day, while leading a patrol, he met and sent down in flames an enemy plane while it was engaged in reglage work. Home address, Daniel H. Buckley (father), Federal Street, Agawam, Mass.

First Lieut. Frank O. Hunter, A. S.

First Lieut. Frank Ordiscoll Hunter, Air Service, 130th Aero Pursuit Squadron. For the following act of extraordinary heroism in action near Verneville, France, Sept. 17, 1918: Leading a patrol of three planes, Lieutenant Hunter attacked eight enemy machines. He then returned to the fight and succeeded in destroying another and driving off the others. Home address, John H. Hunter, father, 216 East Gaston Street, Savannah, Ga.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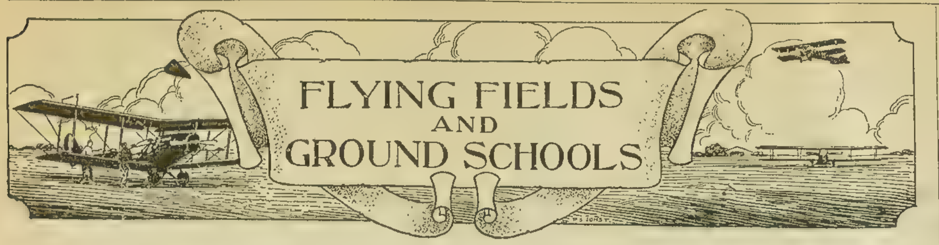

FLYING FIELDS AND GROUND SCHOOLS

Souther Field

During the debate in the House of Representatives on the item of appropriation for the Aerial Mail Service, Mr. Crisp of Georgia gave some statistics relative to Souther Field, which is located in his home town, Americus. Mr. Crisp said that they had been given to him by Major Carlisle H. Wash, commanding officer of the field, who was referred to as "a West Pointer appointed from Minneapolis, and he himself a very distinguished flier." Following is an excerpt from the statement, which brought forth considerable applause:

"The camp was completed this year, and cadets first arrived about May. From that time up to the 5th of November there were graduated as pilots from that camp, 227 cadets. The cadets and officers of the camp had been in the air 20,000 hours. They had flown 1,200,000 miles, equivalent to about 50 times around the world, and with that record they had only one serious accident. I think this is the best record of any camp in the United States."

Gerstner Field

Assistant Secretary of War Crowell has addressed a memorandum to Col. Clinton G. Edgar, Chief of the Supply Section, D. M. A., expressing the gratification of the War Department that the work of reconstruction of Gerstner Field, which was badly damaged by a hurricane on Aug. 6 last, will be completed at almost one-third of the original estimate of $466,000.

Colonel Edgar had reported that the cost will not exceed $130,000, and that particular commendation is deserved by the Commanding Officer of the field and also the Supply Officers, Officer in Charge of Construction, and the officers and enlisted men of the service and Construction Squadrons for their exceptionally good and rapid work.

"The use of troop labor," Secretary Crowell wrote Colonel Edgar, "has been fully justified, and the results far beyond anyone's expectation."

Morrow Field

The Acceptance Park, at Detroit, Mich., has been officially named Morrow Field. The field is named in honor of Lieut. Karl C. Morrow, who was killed in that city on Nov. 11 last while assisting in a celebration of the signing of the armistice.

Fort Sill

A Mosaic of Fort Sill has just been completed by the Photographic Branch, Training Section, Division of Military Aeronautics at Washington. It contains 4,200 prints, and the size is 8 by 16 feet.

March Field

Lieut. O. C. Luce, former quartermaster of the post, is relieved from duty at March Field.

Fifteen new cadets, recently graduated from the ground school at Berkeley, have reported to March Field for flying instruction.

Major F. I. Eglin has returned to March Field and resumed charge of the hanger division of the Flying Department. Lieut. Joseph E. Welker, of the Sanitary Corps has been assigned as Sanitary Officer of the post.

Lieut. O. L. Culley has reported and will be in charge of the lubrication department.

Mather Field

Major Walter W. Wynne has assumed command of Mather Field. He succeeds Lieut. Col. Delos C. Emmons who has been ordered to Dayton.

Wilbur-Wright Field

Lieut. William Marvin, technical executive officer is on a short leave to his home in San Francisco.

On December 24 the Knights of Columbus gave a party for the children of the post.

Many Flying Fields Closed

Upton Jan. 3 the following named flying fields in the United States had been closed by order of the War Department:

Mather, Brooks, Gerstner, Rich, Taliaferro, Carruthers, Eberts, Payne, Taylor, Souther, Dorr, Scott, Chanute, Selfridge, Langley, Bolling, Camp Dick, and also the Army Balloon School at Camp John Wise.

The radio field at Little Silver, N. J., has also been closed.

The First Provisional Wing at Mineola, N. Y., is being demobilized, and the Second Provisional Wing at Park Place, Houston, Tex., has been demobilized and the lease given up.

Among other activities discontinued are the Radio Mechanics Schools at the University of Pittsburgh and Ellington Field, and the Motor Mechanics Schools at St. Paul and Kelly Field.

Class II Flying Discontinued

Instruction in Class II Flying has been discontinued at all Army flying fields. Advices to this effect were recently sent to commanding officers by order of Major General Kenly, Director of Military Aeronautics.

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FOR ALL OFFICERS OF THE UNITED STATES ARMY

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The official standard samples on file with the War Department were manufactured by this Company.

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Rockwell Field, San Diego, Calif.
Langley Field, Hampton, Va.
Bolling Field, Anacostia, D. C.
Potomac Park, Washington, D. C.
First Provisional Training Wing, Garden City, L. I., N. Y.
Wilbur-Wright Field, Fairfield, Ohio.
Curtiss Flying Field, Buffalo, N. Y.
Aviation Repair Depot, Speedway, Ind.
Second Provisional Training Wing, Park Place, Houston, Texas.
Gerstner Field, Lake Charles, La.
Barron Field, Fort Worth, Texas.
Carruthers Field, BenBrook, Texas.
Taliaferro Field, Hicks, Fort Worth, Texas.
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VOL. IV. No. 3 NEW YORK, JANUARY 18, 1919 PRICE 10 CENTS

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U. S. Lags Far Behind Europe in Preparations For Air Transport

British Committee on Civil Aerial Transport

GIVES PEACE PLANS

Report Covers Outlook in Sport, Commerce and Industry

No report on aeronautics so pretentious or as important has ever been published as that of the Civil Aerial Transport Committee of Great Britain which has been presented to the Air Council. The report, covering as it does nearly all aspects of peace-time flying, has in it so much of interest that it is to be hoped that in some way it may be reprinted to serve as a model for a similar report which ought to be made in the United States.

The document fills eighty-three pages of the size of the *Congressional Record* so that our reprinting of the report in its entirety is out of the question.

The committee was appointed on May 22, 1917, to consider the steps which should be taken to develop and regulate aviation after the war for civil and commercial purposes from the domestic, imperial and international standpoint.

It also discusses the extent to which it will be possible to utilize the Army and Navy personnel.

The membership of the committee consisted of some of the most eminent statesmen, scientists and officers in the United Kingdom.

An interim report was presented on Feb. 7, 1918, which indicated the subdivision of the inquiry and discussed the international problems connected with the regulation of airplanes flying from one state to another.

The conclusion "that some international agreement which will permit the utilization of aerial routes immediately after the war is of urgent importance for the purpose of encouraging civil aerial transport, and that therefore early steps should be taken to enter into the necessary negotiations" is full of suggestion to those in charge of the American air program.

The more important parts of the final report of the committee follows:

Final Report of the Committee

To THE AIR COUNCIL—

The terms of reference under which the Civil Aerial Transport Committee was appointed are as follows:

To consider and report to the Air Board with regard to:

1. The steps which should be taken with a view to the development and regulation after the war of aviation for civil and commercial purposes from a domestic, and imperial, and international standpoint.

2. The extent to which it will be possible to utilize for the above purpose the trained personnel and the aircraft which the conclusion of peace may leave surplus to the requirements of the Naval and Military Air Services of the United Kingdom and Overseas Dominions.

It Won't Fly If You Hold It Down, Uncle Sam

The subjects covered by these terms of reference were divided into five headings, as follows:

1. Qustions of Law and Policy.
2. Technical and practical questions as to the possibilities of performance of aircraft and as to the requirements of aerial services.
3. Business questions relating to the position of the aircraft industry after the war, the probabilities of the establishment of aerial transport services and the steps which would be necessary for the maintenance of this industry and for the development of these services.
4. Questions of labor arising in the aircraft industry and in aerial transport service.
5. Problems of scientific research and the special education of expert designers, engineers, and pilots.

Municipal Control and Legislation

The Aerial Navigation Bill as drawn has taken the Merchant Shipping Acts as the model for many of its clauses, *e.g.*, as to registration, certificates of airworthiness, and collision regulations. For this reason it is proposed in the bill that the Home Office should be responsible for general regulations as to flying and for matters in which the police are concerned, and the Board of Trade for administrative regulations of the kind indicated above.

All the powers and duties of regulating aerial transport should be assigned to the Air Ministry. This proposal offers certain advantages in grouping in one department officials and experts responsible for the issue and administration of regulations, which in the present case must to a great extent be governed by naval and military considerations.

Immediate Action Should Be Taken on Matter

DANGER IN DELAY

International Plans May Greatly Hinder Development

The bill adopts as the criterion of British nationality in the case of aircraft the nationality of the owner.

The necessity for certificates of airworthiness would involve the possibility of individual aircraft being subjected to stringent tests and examinations, which in our view would be unnecessary, and which, to be of any use, would require to be repeated at very frequent intervals. The question is one of very considerable importance, since the recognition of foreign certificates in the case of international flying is a matter which must be dealt with in any international convention.

As to certificates of competency for navigators, it should be obligatory on all navigators in charge of aircraft carrying goods or passengers to possess certificates of competency, and the appropriate Government department should have power to require certification of navigators in all cases, but it should be left to such department to decide whether or not certification of navigators of *e.g.*, private aircraft should be enforced by regulation. It seems that the safety of the public will probably be sufficiently ensured by the interest of the private navigator in acquiring sufficient skill to ensure his own safety. Since certificates of competency will be required on all occasions when aircraft of any kind are used in flying over foreign territory, the number of private navigators not taking out certificates will probably be small, in the event of no regulations being issued applicable to them. The absence of obligatory certificates, in the first instance, in the case of the private navigator, seems to be reasonable in the interests of the early development of civil flying.

The collision rules of the Royal Aero Club should be taken as a basis for the collision regulations. Signals of distress regulations are at present the subject of expert inquiry.

The right of landowners in the air space over their land has generally been recognized in English law to extend *usque ad coelum* and, although some authorities have held that the right only extends to a height sufficient for the reasonable enjoyment of the land, any application of the *usque ad coelum* doctrine in its entirety would be fatal to the development of aeronautics. The clause as originally drafted in the bill relieved the owner of aircraft from liability for trespass in respect of his flight over land in the British Islands, but preserved the common law rights and remedies of persons in respect of injury to property or person caused by the aircraft or by any person carried therein.

(*Continued on page* 6)

WALES TAKES AN AIR RIDE WITH GEN. MITCHELL

British Prince in a Spad for Forty-Five Minutes

NEAR MACHINE GUN FIRE

Third Army American Air Service Chief Was Due to Leave for the United States on Sunday, Jan. 12

A flight over the Coblenz bridgehead area, a luncheon with Major General Muir and a dinner dance occupied the time on Jan. 11 of the Prince of Wales, who is the guest of Major General Dickman, commander of the American army of occupation.

An incident of the day was the narrow escape of the prince from a volley of machine gun fire, although he did not know about it until later in the day. An automobile with newspaper correspondents traveling ahead of the prince's machine was halted near Cochem by a German, who exhibited a bullet and explained that a machine gun company was at target practice. The steady popping of guns beyond the hill added emphasis to his story. An officer stationed near by was notified and he telephoned to the practice range, telling the officers there of the situation. The firing ceased just before the royal guest drove past.

The prince professed keen pleasure in his visit to the American airdromes, and the airplane trip was at his request. He went up with Brigadier General William Mitchell, chief of air service of the Third Army. It was General Mitchell's last flight at Coblenz, as he was due to leave Jan. 12 for duty in the United States.

The prince was in the air for forty-five minutes. He was taken up the Moselle, across the Rhine and then flew down the Rhine from the Lorelei rock to Neuwied and back to the airdrome, near Coblenz. The flight was made in a two-seater Spad used as a pursuit airplane. The prince studied the maps during the entire flight and talked with General Mitchell. He declared afterward that the flight was the most picturesque he ever had.

Croix de Guerre for Maj. Kenneth Marr

Advices were received last week at headquarters of the Division of Military Aeronautics that Major Kenneth Marr has been awarded the croix de guerre and that the medal is now on the way to Washington. The citation reads:

"Upon the approval of the Commanding General of the American Expeditionary Forces in France, the Marshal of France, Commander-in-Chief of the French armies of the east, cites to the order of the army corps:

"Capt. Kenneth Marr. Excellent squadron commander of a legendary bravery. Has been a beautiful example for his entire unit. Herewith cited. Nov. 29, 1918."

Major Marr was in command of the 94th Aero Squadron at the front. He recently returned from overseas, and is now stationed at Rockwell Field.

Gasoline for the Air Service

Among the supplies on hand for the use of the Army, as announced in a statement by the Quartermaster General's Department on Dec. 9, are 978,579 gallons of aviation gasoline and 1,075,007 gallons of lubricating oil of all kinds.

Castor Bean Restrictions Off

Special restrictions on the importation of castor beans, issued by the War Trade Board on June 14, 1918, are announced as having been removed.

Brig. Gen. William Mitchell, Air Service, A. E. F.

General Mitchell has been Chief of the Air Service, A. E. F., of the armies in the field and as such has been in direct command of all the flying operations of American Army aviators. He has had a brilliant career in aviation to which branch he went from the Signal Corps.

General Mitchell arrived in Europe on a special mission just at the time the United States declared war and was the first American officer to be cited in orders. He has received many decorations for bravery and skill in handling his command. It is reported that at the time of the St. Mihiel action he had in his command the largest body of aviation troops ever assembled in any army.

General Pershing has written General Mitchell a letter recently published commending the heroic achievements of his squadrons. The latest news from Coblenz, which is now General Mitchell's headquarters, is that the Prince of Wales was taken on an airplane trip by the General to view the beauties of the Rhine near the city.

It is reported that General Mitchell has been ordered home for duty in the reorganization of the Air Service.

AIR RAIDS ON BRITAIN COST 1570 LIVES

During the War the Number of Casualties Reached 5611

In raids on the United Kingdom by the Germans during the war 5611 persons were killed or injured, of whom 4750 were civilians. An official summary of the casualties caused by German airships, airplanes and bombardments from the sea shows these casualties among civilians:

Killed—554 civilian men, 411 women, 295 children.

Injured—1508 civilian men, 1210 women, 772 children.

Three hundred and ten soldiers and sailors were killed and 551 were injured.

There were fifty-one raids by airships, causing the deaths of 498 civilians and the injury of 1236 and the killing of 58 soldiers and sailors and the injuring of 121.

In fifty-nine airplane raids 619 civilians were killed and 1650 were injured. In these raids 238 soldiers and sailors were killed and 400 injured.

In twelve bombardments from the sea 143 civilians were killed.

WHITE EAGLE, CAPRONI'S BIG NEW MACHINE

Italy's Trans-Atlantic Flier to Take the Columbus Route

The correspondent of the London *Daily Telegraph* at Milan reports that Signor Caproni has nearly finished the gigantic machine in which it is intended to fly from Italy to America. The machine is a huge triplane with engines of 3000 horse-power and ample accommodation for a certain number of passengers, for whom cabins and sleeping berths will be available.

The Caproni transatlantic flier is to be named the White Eagle, in allusion to a curious prophecy printed here in 1916 and attributed to an English friar of the seventeenth century. The prophecy announced that there would be a great world war in the twentieth century, which would be started by the evil genius of an emperor in Luther's country in league with another emperor, both of whom had black eagles on their coats of arms, but that civilization would eventually crush the barbarians, whose empires would be divided up into twenty-two states.

ARMY AND NAVY TO CO-OPERATE IN AIR SHOW

Aeronautical Exposition to Take on Permanent Character

FEBRUARY 27 TO MARCH 6

War Trophies and Equipment of Our Own Fighting Arms Are to Be Displayed

Hearty co-operation on the part of the War and Navy Departments is assured for the annual aeronautical show which the Manufacturers Aircraft Association is to hold at Madison Square Garden, from February 27 to March 6. This assurance from Washington means that the exposition will take on the permanent character of a combined effort, uniting national defense, scientific achievements and industrial development.

A statement given out today by the Manufacturers Aircraft Association, indicated that the exposition is to have the benefit of naval and military co-operation and, while no definite announcement may yet be made with regard to trophy displays, it is believed certain that this exposition which will take rank as the first of a national character, will afford opportunity for the public to inspect for the first time, not only some of the material taken from the enemy abroad, but much of the remarkable equipment which is owned by both the Navy and War Departments.

Co-operation and co-ordination will be fundamentals of the exposition. In the early days of the war, the industry was called upon to aid wherever aid was needed and this show will illustrate to what a remarkable degree this assistance was carried out. The War and Navy Departments still maintain close relationships with the industry and many of the notable exhibits therefore, will come through the courtesy and co-operation of the various officials in Washington.

Homologation of Air Records

Data on aviation records is now being collected at all Army flying fields and forwarded to the Homologation Committee of the Air Service Clubs' Association in order to establish present records.

The following are the events being considered for pilots alone and with passengers:

Altitude; duration (non-stop); duration (24 hours); distance (non-stop); distance (24 hours); speed (non-stop), 1 mile, 2 miles, 50 miles, 100, 200, 1000 miles; speed (cross country), 50 miles, 100, 200, 1000 miles; loops (number); water flying (land machines); distance over water, duration over water; climbing time: 6500 ft., 10,000 ft., 15,000 ft., 20,000 ft.

Service Medals, for Civilians

Civilians who pre-eminently aided in winning the war will be awarded appropriate insignia in recognition of their services if bills pending in Congress become a law. One (S. 5182) was introduced by the Chairman of the Committee on Military Affairs early in the present session, and later the same bill (H. R. 13464) was introduced in the House by the chairman of the corresponding committee. They amend the last army appropriation bill, providing medals of honor, distinguished-service crosses and distinguished-service medals, by adding a new paragraph.

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TRIP OF C-1, ROCKAWAY TO KEY WEST

Dirigible Is 200 Feet Long and Has 180,000 Cubic Feet of Gas

WAS BUILT IN AKRON, OHIO

Propelled by Twin Engines of the Hispano-Suiza Type, Developing 300 Horsepower —Names of the Crew

The Navy's dirigible C-1, which left Rockaway Beach, N. Y., Jan. 12, made the trip to Hampton Roads in exactly seven hours. The voyage down the coast, across New Jersey and Eastern Maryland to Washington and Virginia was made without mishap.

Thousands of sightseers at Old Point Comfort and Willoughby Beach witnessed the arrival of the big airship and its descent on the aviation field. Many were out early for the sight and remained several hours before the big gas bag put in appearance over Chesapeake Bay.

"The flight was successful and without a marring incident, if the cold weather is overlooked," said Captain S. V. Parker. The C-1 was bound for Key West. She is 200 feet long, with a gas capacity of 180,000 cubic feet. She is propelled by twin engines of the Hispano-Suiza type, developing 300 horse-power.

The cabin is twenty feet long and ten feet wide. The sleeping quarters are encased with glass for protection against the wind, and emergency provisions were carried. Aerial and navigating instruments are fixed to the bridge, mounted in the centre of the cabin. The C-1 was finished in Akron, O., by the Goodyear Tire & Rubber Co. less than a month ago.

The engines are in the rear, being partly balanced in weight by a gun mounted forward. Along the sides of the great gray envelope are the words "U. S. Navy" in red.

The crew consisted of Lieut. J. C. Lawrence, pilot; Ensign E. B. Packard, Ensign W. P. Hansen, radio operator; Gunner W. J. Medusky, H. G. Ritter, engineer, and George Du Bon, helmsman.

New Reserve M. A.'s

The following officers of the Air Service have recently been rated as Reserve Military Aviators: Capt. Jacob S. Schlussel, First Lieuts. James C. Fair and Sydney H. MacBey, Second Lieuts. Ferris F. Hamilton, Russell F. Swift, Henry C. Fisk, Jr., C. J. Fuller, William L. Fancher, Hugh F. Porter and Stanton T. Smith.

(C) *Committee on Public Information*

Col. H. H. Arnold, A. S., A.

Col. H. H. Arnold is one of the best known officers in the Air Service. He was graduated from the Military Academy, West Point, in 1907, and was assigned to the Infantry in the Philippine Islands, where he was on duty for several years.

He entered the Air Service in April, 1911, learning to pilot at Dayton, Ohio, from the Wrights. After qualifying for a pilot's license in June, 1911, he was ordered to the aviation fields of College Park and Augusta, Ga., where he remained until September, 1912. During this time he competed at the aviation meet at Nassau Boulevard.

Colonel Arnold was one of the first flying officers to fly at maneuvers, spot for artillery fire, experiment with radio and smoke signaling. He was called to Washington in 1913 for duty in the office of Chief Signal Officer as assistant in charge of aviation. For three years thereafter Lieutenant Arnold was with the infantry, but was ordered in 1916 to San Diego, where he was in charge of the machine shops. His next command was of the 7th Aero Squadron stationed at Panama until April, 1917. From then on he has been one of the most influential officers in the expansion of the Air Service in Washington. His rapid promotion from Captain to Colonel at the age of 30 indicates his brilliant service. He was Assistant Director of Military Aeronautics from May until November, 1918, when he was ordered overseas, where he visited schools, supply depots, zone of advance, the first and second armies and other Air Service fields. He is at present in Washington.

TO LET BAKER SETTLE ALL BIG WAR CONTRACT

Both Branches of Congress Act on Informal Agreements

Validation and adjustment by the Secretary of War of informal war contracts involving the expenditure of more than $2,700,000,000 is authorized by a bill passed by the House on Jan. 9 by a vote of 270 to 30. Approximately 6600 contracts in this country and a large number in England, France and Italy would be affected.

A similar bill, also placing adjustment in the hands of the Secretary of War, was approved on the same day by the Senate Military Committee, which reversed its previous action in voting for the creation of a special commission.

Opponents of the bill passed by the House favored adjustment of the contracts by a Congressional committee acting with the Attorney General and the Secretary of War and they sought to amend the measure, but were voted down. Numerous other amendments were offered, but only two minor ones changing the phraseology were accepted.

Republican Leader Mann, speaking in support of the bill, said Congress could not preserve its self-respect if it failed to authorize payments of contracts which were made in good faith.

During the consideration of the bill in the House Representative La Guardia offered an amendment that the act "shall not authorize payments to be made of any claim under such agreements for aircraft production, including motors and aircraft supplies." The amendment was rejected by a vote of [illegible]3 to 32.

Earlier in the debate Mr. Schallenberger, in reply to a question by Mr. King as to whether there are any aircraft contracts involved, stated that he was informed by the Assistant Secretary of War that "as far as he could state, the Hughes investigation aircraft contracts are not included in this bill."

GENERAL SQUIER TELLS OF AIR ACHIEVEMENTS

An Interesting Address Before the Electrical Engineers

OUR MANY ACHIEVEMENTS

Fliers Trained, the NC-1, Spruce Production, Discovery of Helium, Airplane Radiophone and the Liberty

Following is an abstract of an address delivered by Major Gen. George O. Squier, Chief Signal Officer of the Army, before the American Institute of Electrical Engineers at Engineers' Hall, No. 25 West 39th Street, New York, at 8:30 p. m., on Friday, Jan. 10. The title is "Aeronautics in the United States, 1918." This address was delivered at the direction of the Secretary of War. The figures presented are as of Nov. 11, the date of the armistice.

It is an interesting fact that Major General Squier delivered an address from the same platform before the American Society of Mechanical Engineers on the subject of Military Aeronautics at the annual meeting of that organization ten years ago. At that time the Signal Corps of the Army had just issued an advertisement and specification for a heavier-than-air flying machine, the first to be developed for military purposes in the United States. This was developed by the Wright Brothers and tested and accepted at Fort Myer, Virginia.

During the eight years following the United States appropriated less than a million dollars for the further development of military aeronautics. After stating these facts General Squier said in part:

Congressional Appropriations

"Once the United States had actually entered the war the pressure of our Allies and a sudden realization of our real situation in aeronautics led Congress to grant for this purpose, in the Act of May 12, 1917, $10,800,000, the Act of June 15, 1917, $31,846,000, and finally the appropriation of $640,000,000, the largest ever made by Congress for one specific purpose, which was put through the House of Representatives' Military Affairs Committee in two sittings, the House itself in one, the Senate Military Affairs Committee in forty-five minutes, and the Senate itself a week later, becoming a law on July 24, 1917, three months and a half after the outbreak of the war.

"More than 8600 fliers have been trained in the United States since its entry into the war. There have been training fatalities in the United States, as in all other countries where training has been conducted on a large scale. However, when the fact is realized that our students have flown more than 880,000 hours, which is the equivalent to more than 66,000,000 miles, it will be seen that our training casualties have been astonishingly few. Statistics show that the United States has a lower percentage of fatalities than any other of the allied countries. The monthly average in the United States has been only one fatality for each 3200 hours flown.

"More than 16,000 Liberty engines were produced during the calendar year 1918. To Nov. 11, 1918, more than 14,000 Liberty engines were produced, equivalent to 5,700,000 brake horse power. The production of service balloons met all service requirements.

"On Nov. 11, 1918, there had been developed, tested and adopted by the Army four airplanes, on which production would have started in the calendar year. They were the Lepere or L U S A C-11, equipped with the Liberty engine, the U. S. De Haviland 9-A, equipped with the Liberty engine, the Martin bomber, equipped with two Liberty engines, and the Loening two-seater

(*Continued on page* 11.)

SNAP SHOTS FROM ALOFT

The unfortunate position in which this country finds itself in regard to its future in the air can be laid directly to the absence of cooperation between the Army and Navy, the Post Office, and the lack of knowledge of aeronautic problems in Congress.

The Air Service of the Army has been so active in its propaganda for an independent Air Service that it has aroused resentment in quarters where support is most necessary. The Navy, with an object lesson in England of the subordination of naval to army personnel and believing that it has handled its aircraft program efficiently and successfully, wishes to go on independently and without outside interference.

The Post Office Department feels that it can succeed with air mails only if it is run from the standpoint of getting the mails through regardless of limitations of the weather.

In Congress, so much has been made of the investigations of aircraft production that the whole field of aeronautics seems to be tainted with mismanagement. Whenever the subject is brought up a violent discussion ensues which seems to raise such a fog of misinformation that a good landing is impossible.

The National Advisory Committee for Aeronautics is so engrossed in voluminous scientific reports that it has not as yet given the practical side of the general question of the future of the airplane in peace time the attention it deserves.

It is now time for all to get together and form some body which, while it may not control, will have in its membership those whose word is controlling.

It is suggested that the Secretaries of War and Navy, the Postmaster-General and one representative from their departments, gather about them representatives from the Advisory Committee, the Departments of Commerce and Labor and form a controlling committee which can do for the United States what the Civil Aerial Transport Committee has done for Great Britain.

Medals of Honor for Men in the Navy

House Bill 12194 was reported without amendment to the Senate by Mr. Swanson from the Committee on Military Affairs on Jan. 9, and passed after a very brief debate.

This bill authorizes the award, under specified conditions, of medals of honor, distinguished service medals and Navy crosses to any person in the United States Naval Service since April 6, 1917. An award of any one of the three insignia carries with it an increase in pay of $2 per month to an enlisted or enrolled man.

Law Prefers to Travel by Airplane

The British delegates to the peace conference departed for Paris January 12. Premier Lloyd George, with the Premiers of the dominions and the representatives of India, travelled by the ordinary route. Andrew Bonar Law, the Chancellor of the Exchequer, made the trip by airplane, as he invariably does when he goes to France.

Transferred to the A. S. (A.)

Special Orders, No. 244, Oct. 18, 1918, War Department, is amended to include the officers hereinafter named, who were, prior to that date, on duty in the Division of Military Aeronautics, in the transfer or assignment of officers to the Air Service (Military Aeronautics), the United States Army:

Cols. Clarence R. Day, Edward A. Deeds, Joseph B. Douglas, Stanley D. Embick, James E. Fechet, Robert O. Van Horn and Henry C. Whitehead.

Lieut. Cols. Olan C. Aleshire, Theodore A. Baldwin, Jr., Thomas L. Crystal, Ira F. Fravel, Harold Geiger, Harry W. Gregg, George B. Hunter, Frederick M. Jones, Roy C. Kirtland, Shelby C. Leasure, James A. Mars, Leonard J. Mygatt, George E. Nelson, William F. Pearson, George H. Shields, Jr., H. A. Toulmin, Jr., and J. W. S. Wuest.

Majors James E. Chaney, Jenner Y. Chisum, Robert Coker, Dana H. Crissy, Stiles M. Decker, Walter H. Frank, Marion O. French, James L. Frink, William H. Garrison, Jr., Cushman Hartwell, Frank M. Kennedy, Elbe A. Lathrop, Charles E. Livingston, Phelps Newberry, Robert E. O'Brien, Frederick C. Phelps, Paul Pleiss, Joseph C. Riley, Jacob H. Rudolph, John G. Thornell, Percy E. Van Nestrand, Harry R. Vaughan, Walter W. Vautsmeier, George R. Wadsworth and Herbert H. White.

Army Aviators Honor Roosevelt

Army aviators from Hazelhurst Field, Mineola, L. I., paid a last tribute to the late Colonel Roosevelt from the air on Jan. 6. Soon after the death of the Colonel was reported, the commanding officer at Hazelhurst Field ordered ten army pilots to fly to Oyster Bay and keep up an aerial patrol over the home of the ex-President for twenty-four hours. At intervals floral wreaths were dropped upon the grounds at Sagamore Hill as a token of the high esteem with which the army, and particularly the Air Service held Colonel Theodore Roosevelt.

Commander J. H. Towers, U. S. N.
Photo Harris & Ewing

From the time of his entrance to the Naval Academy on Aug. 30, 1902, by appointment from the State of Georgia, the career of Commander John H. Towers has been one of constant activity and progress in the line of aviation.

Graduating on Feb. 12, 1906, before the full four years' course had been completed, on account of a shortage in officers, Midshipman Towers was ordered to the battleship Kentucky, on which he cruised in Cuban waters and around the world. He was detached in April, 1909, and sent to duty at the Philadelphia Navy Yard in connection with the fitting out of the battleship Michigan. He joined this ship on Jan. 4, 1910, and served on her until June 20, 1911.

With the latter date the identification of Lieut. Towers with aviation began and he was ordered to Hammondsport, N. Y., where by an arrangement Glen H. Curtiss was to build two seaplanes and instruct two officers in flying. He remained there about three months.

On Sept. 18 following Lieutenant Towers, with Lieutenants John Rodgers and T. G. Ellyson, was ordered to Annapolis, where three small hangars had been erected. They had three machines, one being a seaplane, one a Curtiss land plane, and one a Wright plane, and they continued to fly there until Jan. 5 1912, when Lieutenant Towers was ordered to San Diego, where Mr. Curtiss had an experimental camp.

The young lieutenant remained at San Diego until May of the same year when he was ordered back to Annapolis, where the aviation camp was re-established and where the work of training officers in flying was continued. Lieutenant Towers then became senior officer, and by fall had completed the training of seven officers. At the same time he was also engaged in development work. It was here that on Oct. 6, 1912, Lieutenant Towers made a new world's record for sustained flight of six hours and eleven minutes. A Curtiss seaplane was used.

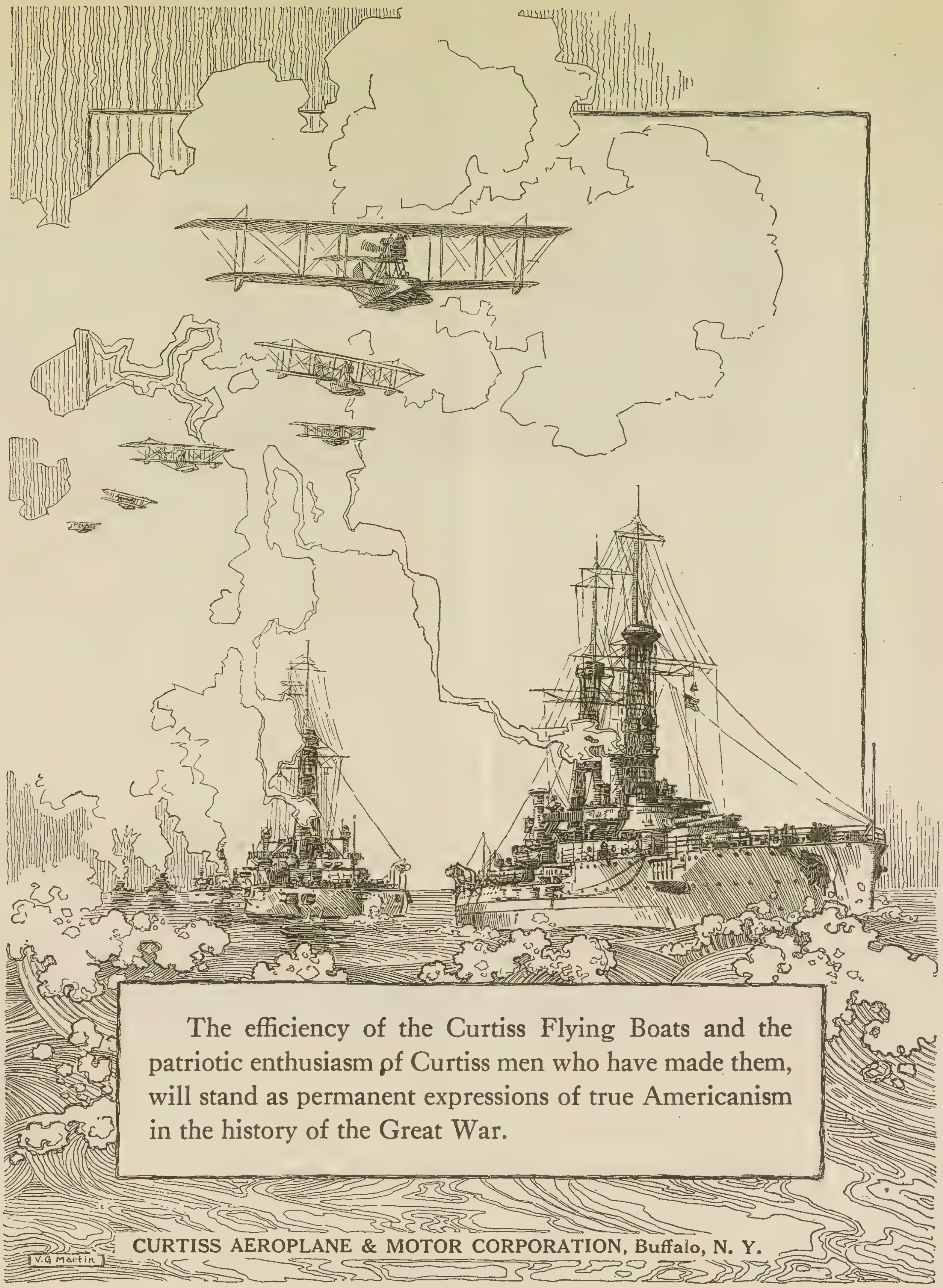
In January, 1913, Lieutenant Towers was sent to Guantanamo, Cuba, to continue training, and to educate the fleet at that naval base in the possibilities of aircraft. He was in command of the Cuban camp.

Lieutenant Towers was placed in charge of the flying school at the Florida city, and he so remained until April 19, when he was ordered to take charge of an aviation detachment to Mexico on the U. S. S. Birmingham on account of the troubles at Tampico and Vera Cruz. This duty completed, he was ordered back to Pensacola. Arriving on June 17, three days later, he was sent to Washington.

Among the special duties of Commander Towers has been to assist in the development and building of a Curtiss seaplane to cross the Atlantic. In this work he was associated with the Royal Flying Corps until Aug. 4, 1914, when upon his own application he was ordered abroad as an observer in the war. He went first to England, and then to Holland, and returning to England was appointed assistant naval attache of the United States Embassy at London. While there he gave special attention to aviation matters, and also made several trips thence to France, visiting the principal air stations, and spending two weeks with the British forces outside Dunkirk.

Returning to the United States on Oct. 1, 1916, he was detailed to duty in the Navy Department in the Office of Operations, where he was the only aviation officer until the outbreak of the war. Recently promoted to the rank of commander (temporary), Commander Towers is now senior assistant to the Director of Naval Aviation.

Commander Towers is a member of the National Advisory Committee for Aeronautics, Joint Army and Navy Board on Aeronautic Cognizance, Army and Navy Airship Board, Joint Army and Navy Technical Aircraft Board, and senior member of the board for the promotion of naval aviators of the Reserve Force.



The efficiency of the Curtiss Flying Boats and the patriotic enthusiasm of Curtiss men who have made them, will stand as permanent expressions of true Americanism in the history of the Great War.

CURTISS AEROPLANE & MOTOR CORPORATION, Buffalo, N. Y.

British Air Transport Report

(*Continued from page* 1)

It is possible the courts might hold aircraft to be within the class of those things which the owner keeps or uses at his peril. The principles applicable should be defined by legislation rather than be left for solution by judicial decisions; as far as damage done by aircraft is concerned, the deprivation of the landowner of what is almost certainly an existing right of property should be compensated by what will be in effect an insurance of himself and his property against such damage.

As affecting the question of nuisance or trespass to the property of the landowner in the air space above his land, the defining of some altitude, flying below which would involve a civil liability on the owner of aircraft, is impracticable, it will be sufficient to protect the landowner by giving him a specific right of action for damages for actual nuisance caused in breach of flying regulations. Since nuisances by aircraft are most likely to arise in connection with the ascent from and landing at aerodromes, we recommend that special attention should be paid to the flying regulations applicable to such ascent and landing.

We desire to emphasize alike the importance of uniform legislation, so far as possible, throughout the Empire on aeronautical matters, and of avoiding any appearance of dictating to the Dominions or of infringing in any way their local autonomy. In our view, the clause rightly applies universally throughout the Empire the provisions of an international character—namely, those relating to registration, collisions, aircraft papers, and signals of distress—and we hope that H.M. Government will take steps to circulate the bill, in the form in which they may themselves adopt it, to the various Dominions and Colonial Governments, so that the latter may have an opportunity of considering whether they will adopt it, with or without modifications to suit local conditions, for their own territories, and, if so, of expressing their views as to the means to be applied for applying it to those territories.

Commander F. G. Coburn, U. S. N.

Technical and Practical Questions

The carriage of mails, of passengers, and of certain classes of goods by aircraft will present no difficulty from the technical point of view. We are confident that demands for aerial services to provide such carriage will arise immediately after the war, and that it is imperative that every endeavor should be made to prepare for these demands.

It is scarcely necessary to point out the extreme importance to this country of being first in the field in the matter of aerial transport. An experiment service should be organized as early as possible, but this recommendation should not be understood as implying that all other aerial services that may be suggested should await the final results of the experiment. On the contrary, we think that special measures should be taken, whether by direct State effort or by the encouragement of individual enterprise, with the object of commencing schemes of transport at as early a date as possible on the conclusion of the war.

Owing to the absence of any reliable data to serve as a guide, it has been impossible to frame any estimate of the running costs of aerial services under peace conditions, and consequently of the volume of aerial traffic likely to be forthcoming. While no good purpose would have been served by putting forward estimated figures of running costs which, from the nature of the case, would necessarily have been almost wholly the result of guesswork, nevertheless it seems worth while to draw attention to certain factors which must limit the costs of aerial services if they are to hold their own in competition with alternative means of transport, and which are likely to limit the demand for them.

It is necessary to distinguish with reference to alternative means of transport (the alternative means being surface transport) between developed and undeveloped countries. In developed countries the governing advantage of aerial over surface transport must be speed. The extent of the advantage will vary with the effectiveness of the alternative means, but where alternative means exist it must be assumed that they will be improved and rendered fully effective. In undeveloped countries the advantage will lie with the means of transport best calculated to provide access to points previously inaccessible, and the absence of road or railway communication must add vastly to the commercial importance of the ubiquitous flightways of the air. In the case of countries in or between which surface transport facilities are interrupted, as, for example, where there is the interruption of a sea passage, both the factors above mentioned should operate to the advantage of aerial transport.

High load and speed are antagonistic elements in the problem. To secure high speed, the commercial load must not exceed 25 per cent of the total loaded weight of an aeroplane. That is to say, that the loading efficiency or the ratio of useful load to gross weight in an aeroplane is only poor. On this account it would seem as though aeroplane transport must always remain auxiliary to surface transport and that speed must always be in the end the predominant factor of advantage.

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Comparing the train with the aeroplane, the train as a traffic unit of movement is large. There must, therefore, be wider intervals of delay for the accumulation of loads between successive units than in the case of the aeroplane. The aeroplane is a small unit, and therefore a flow of urgent traffic can be given by a constant succession of units from the aerodrome, with consequent time economy. The aeroplane affords the better time-saving the longer the journeys, because in long journeys the time loss between the home and the aerodrome is a less appreciable factor; the saving of time from speedy flight only counteracts this loss for journeys in excess of some minimum distance.

The absence of a track is a great financial advantage. The expenses standing in lieu thereof are far less, viz., the cost of landing grounds, wireless installations, weather-reporting services, and signaling of routes at night or in fog. The cost of landing grounds will only be a small factor per "aeroplane mile" in any reasonable commercial scheme of transport, but as aeroplanes become increasingly reliable the need for alighting grounds will not be wholly removed, since safety is a paramount condition; moreover, multiple-engined machines, desirable as they are from the point of view of safety, are commercially justified only when the loads are great enough to warrant aircraft of this size.

Passenger traffic divides itself into two distinct sections, that which moves for business and that which moves for pleasure. Business traffic will turn primarily on speed and reliability, and will consist of inward and outward traffic where rapidity of movement is an important consideration. Economy of time is of great importance to many business men who find absence from their regular place of work disadvantageous. As it becomes possible by aeroplane to fly 400 to 500 miles out and home within the day, and to give a reasonable interval for the conduct of business between the flights, so it becomes likely that many business men will avail themselves of the opportunity.

The occasional use of single machines for rapid journeys in any direction rather than along a fixed route, carrying occupants who pay special fees for the high speed, will probably be one of the early and increasing lines of development. It will educate the public and prepare them for regular services. This could be undertaken immediately peace comes, and would not be open to the same objection as any premature attempt to run a daily service to scheduled time.

With regard to passenger traffic generally, the question of safety in connection, more particularly, with aeroplanes will be of the highest importance. The large number of accidents which occur at the present time are, in our opinion, chiefly due to inexperience and taking risks during training and practice which would not be justified in ordinary times. Improvements are continually being made with the object of reducing accidents, and in the ordinary course of events it is not too much to expect a large reduction in their number at the conclusion of the war. Thus the chief deterrent to flying becoming universal will be removed without any remarkable invention being made.

Pleasure traffic will depend on novelty, comfort and safety. Flight may afford pleasure in itself, but pleasure traffic will be seasonal in character, will depend largely on weather, and will be more costly the more irregular it is. There is likely to be small regular demand, which will grow as flight movement becomes a habit. The demand in the immediate future will probably not be extensive, owing to the cost, but it would appear practicable to open routes from well chosen centers.

Goods traffic will be for (*a*) mails and (*b*) general goods. Commercial considerations are not the only ones to be taken into account in determining upon an aerial mail. It is not indispensable that the cost of a letter by aerial mail should be fully borne by the service, if Imperial or other reasons demand that the use of aircraft shall thus be developed. Mails offer a most promising class of traffic, because the load to be carried is reasonably uniform, the weight small and the demand for speed great.

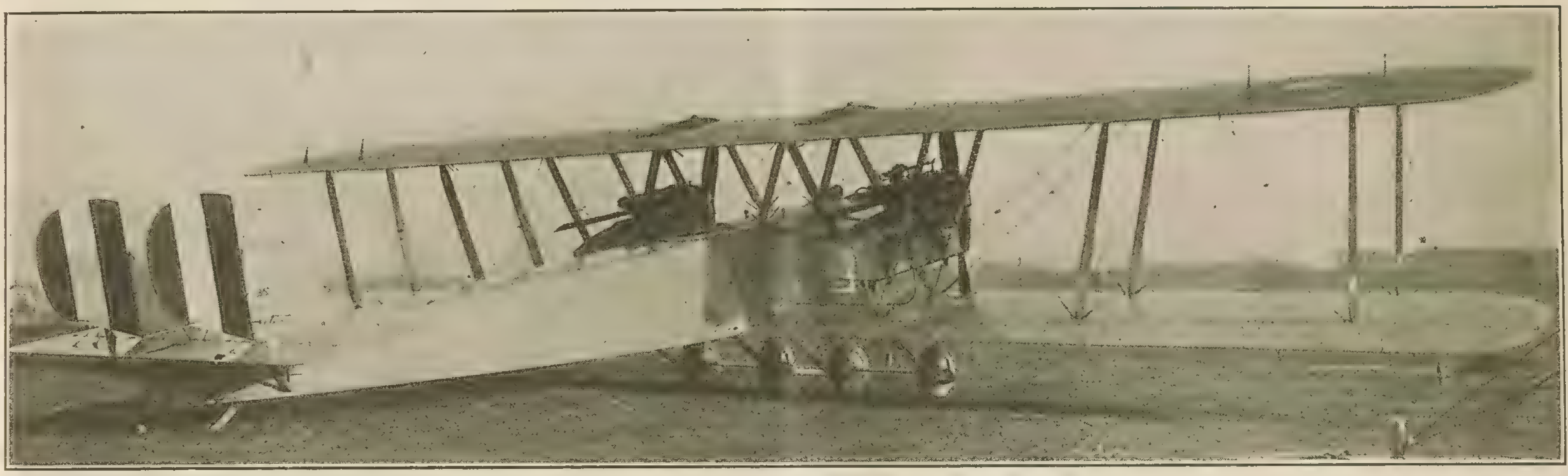
The cost of electric cable communication, say, to Johannesburg, at £8 10s. per 100 words (a message taking about 24 hours to reach its destination), can be contrasted with the cost, say, 2s. 6d., of sending a letter of 5000 words to the same spot in six days by aeroplane. The London mail could in the future be ionveyed to Calcutta in four days, as against 16 days, the minimum at present. These instances illustrate the intrinsic utility of air services, apart from the value of making closer links within the Empire and of giving support to the construction of aircraft so as to be ready for war emergencies.

It is more difficult to settle the reasonable expectation of general goods traffic, which must take the form of express parcels, usually of small weight. Furs, lace, jewels, precious metals, extracts, essences, valuable feathers, etc., might be carried by air because of their high value; also rare and out of season fruits and vegetables, flowers, and perishable articles generally. Newspapers and periodicals afford scope for aerial services, because news grows stale quickly. Drugs, dyes, chemicals, medicines, optical and surgical and other instruments will be so carried, as often these are wanted quickly. Wherever, for want of some article, life is endangered or industry is at a standstill, as where some spare part or tool is required for a machine, the aeroplane will afford the quick remedy, and its flight will be profitable. Cinematograph films, gramophone records and commercial samples may figure in the class of goods carried by aircraft. Their rapid distribution will quicken exchange, and this will react to increase the volume of traffic, but the whole series of illustrations above given tends only to show how limited the total volume or weight of aerial goods traffic is likely to be in developed countries.

As to the respective capacities of the airship and the aeroplane, we think it advisable to make some general comparison, from the commercial point of view, between the two classes of aircraft based upon this information. For this purpose the largest type of airship is taken as an example, since it is found that as the size of an airship increases the ratio of its useful load to gross weight improves, *e.g.*, for a ship of sixty tons gross, thirty tons of disposable load are available. This represents roughly nine times the load carrying capacity of the largest modern aeroplane. The prime cost per pound of disposable load in the case of an airship is estimated at almost one-half the prime cost per pound in the case of an aeroplane. The economic limit of the journey without landing is about 1000 miles in the case of an airship, as against 500 miles in the case of an aeroplane. The airship, therefore, has the advantage of a greater load capacity; but its speed, under present conditions, is slower, being probably not more than 60 m.p.h. In this respect the performance of the airship on overland routes would appear in general to be open to keener competition from rail transport. On the other hand, on sea routes the airship will, save in contrary winds, have a marked advantage over steamships as to speed. As compared with the aeroplane, the cost of handling and housing airships will be higher, and, until open-air mooring is fully developed, the regularity of airship services will be more adversely affected by high winds than that of aeroplane services. In journews in which speed is not the most material factor, and particularly where passenegrs are being carried, and safety is consequently a paramount consideration, the airship offers advantages over the aeroplane in the way of comfort, ease of navigation, capacity for safe flight at low altitudes, and high ratio of disposable load.

On the question of landing grounds along aerial routes we agree with the majority of the Special Committee in not feeling able to recommend that chains of landing grounds should necessarily be laid out at regular and comparatively short—say ten-mile—intervals along aerial routes, especially in developed countries, we consider, nevertheless, that the advantages of lines of landing grounds on certain main routes hereafter to be laid out would be very great, and that such lines would largely assist the development of civil aerial transport. In undeveloped countries regular chains of landing grounds at suitable intervals along aerial routes will be indispensable; and in such countries the consequent expense will be less material in view of the comparative advantages which aircraft will enjoy in competition with other forms of transport. Regular sea stations for the landing of aircraft are at the outset essential if trans-oceanic aerial transport is to be seriously attempted. It is recommended that when questions of laying out, maintaining, or abandoning landing grounds for military purposes have to be considered, regard should be had, if possible, to the probable needs of civil aerial transport hereafter. The establishment of landing grounds, within urban areas should not necessarily be precluded, and the institution of rapid transit schemes between aerodromes and town centers, such as post offices, would be of great value.

However, military considerations must override all others, and, though we have necessarily dealt with our subject matter mainly from a commercial point of view, we would emphasize the importance: first, of the need that all established commercial air routes with their aerodromes and landing places should be suitable for strategical and tactical use in the event of war; and, secondly, of the need for the rapid convert-



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ibility in the same event of some types of commercial aircraft to military uses. It is vitally necessary, in the interests of national safety, that all air routes established should conform fully to military requirements, and that the development and manufacture of types of commercial aircraft should for a long time be governed by the requirement that they should be in some manner of effective military use, and that this requirement should be satisfied even at the cost of a serious diminution in the commercial value of both routes and craft.

With regard to the marking of aerial routes we do not recommend the institution of a general system of marking for the whole country, but suggest that if companies operating commercial routes provide their own schemes of marking, these should be subject to some central control for the purpose of avoiding a possible confusion arising from the employment of different schemes. We are of opinion that it will not be necessary for the state to lay down any definite scheme for the provision of route marks. Probable improvements of signaling by directional wireless and other methods of signaling from aerodromes by night and day would seem to make it inadvisable to embark upon the organization of any universal system of arbitrary markings.

In concluding that part of our report which deals with the practical possibilities of aerial transport we desire to draw attention to the great importance of meteorology in conection with aerial routes and services generally. A system of meteorological stations should be organized immediately after the conclusion of the war. The provision and management of which should be left to the state and not to private enterprise.

Business Questions

In order to enable the industry to respond to war emergencies, the services of the industry should continue to be employed for the design and development of the naval and military aircraft and for the carrying out of the national construction of aircraft for the future, for this would enable the design and construction of aircraft for civil transport purposes to grow on a sound and permanent basis. The development of civil aerial transport services reasonably to be anticipated at the end of the war, if no special steps are taken to foster it, will not be sufficient to keep the manufacturing industry alive, and will not for some years to come involve any appreciable volume of orders being placed with the producers in this country.

This great industrial organization, amply equipped as it is with capital, material, machinery, expert knowledge and trained labor, is in anything but a secure position. Fostered as it has been wholly by the exceptional conditions of the last four years, it must wither, and very rapidly, in proportion as these conditions or their equivalents cease to obtain.

We are thus led to consider the importance in the widest national and imperial interests of the development of the use of aircraft after the war. If it appeared that the public interest was not involved in the continued and extended use of aircraft, the dwindling of the aircraft manufacturing industry, with whatever hardship to individuals it might be accompanied, would not be a national disaster, but we could not neglect the possibility that no less vital an interest than the safety of the state itself might be concerned in the matter.

The development of civil aerial transport services, in order to create a market for the industry and consequently to enable it to maintain its power of production and of progressive improvement in design is essential for the safety of the Empire. Aerial transport services cannot be developed by the ordinary commercial methods so as to secure the required result, and state action of some kind in developing aerial transport services is therefore unavoidable.

As to the form of state action to be taken the two main alternatives are:

(*a*) State assistance to private enterprise.

(*b*) State ownership or participation in the ownership of aerial transport undertakings.

The choice involves the consideration of political questions, labor questions, and questions of national finance upon which a committee constituted as ours is is hardly competent to advise, and which seems appropriate for Cabinet decision.

While considerations of national security afford the all-important reason for advocating state action for the development of aerial transport services, other advantages,

Col. M. F. Davis, Chief of Training Section, A. S., Member of Control Board
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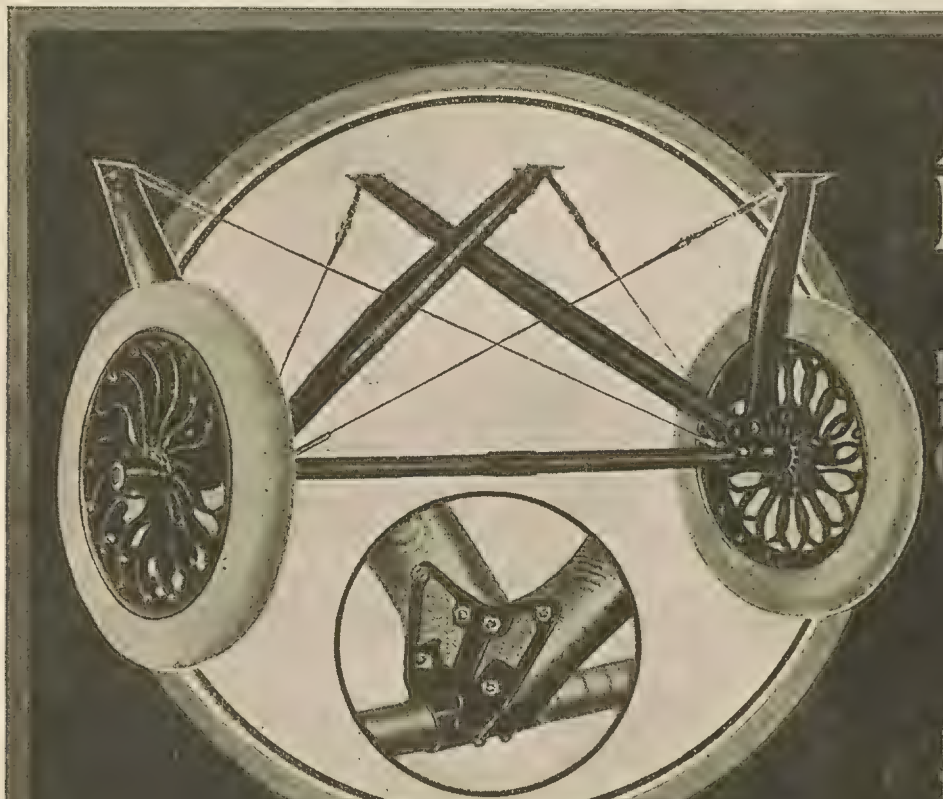

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also to be hoped for from such development, should not be overlooked. Among the most important of the national benefits to be hoped for are increased facilities for friendly intercourse with foreign nations, and, still more, the improvement in intercommunication between the widely scattered countries which make up the British Empire. So far as the governments of the self-governing Dominions and of India are concerned, it will be for those governments to determine their own attitude in regard to the problems presented by the subject of our discussions. Whether they decide themselves to run or to join with the British Government or each other in the running of aerial services, or not, it is in any case to be hoped that by arrangement with the British Government they may be willing to give all necessary facilities for the arrival and departure of British aircraft. Such facilities would include the provision of aerodromes and landing places or the grant to the authorities controlling British aerial services of the right to acquire them for themselves. The Dominion and Indian Governments would, we hope, also be willing, unless they were running state-owned aerial services of their own, to allow the British authorities to tender to their post offices for the carriage of their mails, and generally to operate in their territory on the same terms as their own citizens. It has already been shown that the longer the distances which it is desired to cover rapidly the greater are likely to be the commercial advantages enjoyed by aerial transport for such purposes as the carriage of mails as compared, *e.g.*, with rail and steamer transport, whence it appears that the Dominions and India, owing to their great geographical area and the wide distances which, in many cases, separate their important centers of population, offer a fruitful field for the development of civil aeronautics.

It requires but little imagination to envisage the possibilities of aerial communication in such a country as Canada, where the journey from Halifax to Victoria is one of nearly 3000 miles, or in Australia, where a journey round the coast from Brisbane to Perth, is slightly longer, or in the Union of South Africa, where a journey from Capetown to Johannesburg is one of 800 miles, and leads on to Buluwayo or Salisbury, and thence across Northern Rhodesia, and what was once German East Africa, to British East Africa, the Nile Valley, and Cairo.

In all countries in which other means of communication are few and difficult aerial services would be particularly valuable for purposes of exploration and survey, owing to the remarkable developments brought about by the war in the art of aerial photography. Aircraft should also provide a valuable means of aiding research in zoological and other physical sciences in many parts of the world. If His Majesty's Government accept our our main proposition that the fullest possible development of civil aerial transport services immediately after the war is a national necessity, and that it cannot be achieved without state action, it will be necessary for them to settle at once what form that action is to take. If it is to take the form of assistance to private enterprise, it will be necessary for His Majesty's Government to enter into communication with the promoters of such enterprise, and to satisfy themselves as to the sufficiency of their proposals. If it is to take the form of direct state ownership of or participation in aerial transport services, it will be necessary to settle precisely what services are to be undertaken, and to prepare in advance all the measures necessary for bringing them into operation immediately on the declaration of peace. In either event, the negotiation of a convention, at any rate with our Allies, as recommended in our interim report, and, probably, the arrangement of agreements with the Dominion and other Governments of the Empire, to regulate inter-imperial and international flying, would seem to be indispensable preliminaries to action, and should, we venture to suggest, be taken in hand as soon as possible.

Problems of Scientific Research

With regard to the method of carrying on in the future (1) tests and investigations of finished products in the shape of aircraft engines and sundries, and (2) further research including physical model and full scale research, it appears that the choice lies between the work being done either (*a*) by an organization such as the contemplated research association of the Society of British Aircraft Constructors and Aeronautical Society, which should be financed by the Society of British Aircraft Constructors with the assistance of grants from the Department of Scientific and Industrial Research, or (*b*) by a Government authority such as the National Physical Laboratory, directly financed by the State. We would recommend that the first alternative be adopted if possible; but, failing that, the second alternative should be resorted to.

With regard to meteorology, we desire to call special attention to the necessity of ensuring cooperation between the Meteorological Office and the authorities controlling the meteorological stations in the Dominions. It is not, indeed, only the self-governing Dominions that are concerned in this matter. Similar work done by the Governments of the Crown and other Colonies and Protectorates may well be of great importance, particularly in the case of long distance routes passing through remote parts of the Empire, and we would recommend that everything possible should be done to strengthen and increase the efficiency of the meteorological offices of the Colonies and Protectorates. It would also be desirable that steps should be taken to coordinate the work of the Meteorological Offices of groups of Colonies and Protectorates geographically close to one another, as, for example, the East and West African groups of Colonies and Protectorates. Combined results are likely to be more valuable than the uncoordinated results of the work of a number of comparatively small stations.

In regard to Accident Investigation, while a distinction may legitimately be drawn between privately owned aircraft and aircraft carrying passengers for hire, we think, nevertheless, that the appropriate Government Department should have power to order an official investigation to be held, if it is thought necessary in the public interest, in any case of serious accident, no matter what class of aircraft may be involved in such accident. It appears to us that the knowledge that a State authority was empowered to hold an investigation into any case of serious accident, if it thought fit, would give the public a sense of security, and would thus be to the advantage of the aerial transport industry rather than otherwise.

Concluding Observations

In conclusion we desire to point out that preliminary action has already been taken by several of our Allies for the purpose of preparing for civil aerial transport, in some cases by the institution of experimental postal services. It has been reported, also, that enemy countries have moved in this direction. We consider it of vital importance that the British Empire should not be allowed to lag behind other nations in this movement, more especially as this might have a very serious effect upon the position of the Empire with regard to the international aspects of aerial transport. We would urge that there is a large amount of preliminary work which could be commenced at once. We have already indicated the urgency of the following matters: Preliminary inquiries as to routes, landing grounds, and aerodromes, involving in the two latter cases consultation with local authorities; the necessity for preliminary discussion with the Dominions and our Allies on the broad questions of principle, and the immediate establishment of a Bureau of Research. We consider, also, that it is a matter of urgent necessity to establish a system of propaganda throughout the Empire in order to convince the whole nation of the vast importance and possibilities of aerial transport and to familiarize the Governments and the local authorities with the subject. There is evidence of the initiation of such a system in enemy countries.

In order to carry out these views we therefore recommend that a special branch (commencing on quite a modest scale) should be formed at once for the purpose specified under the Air Ministry, to ensure that all necessary preliminary action be taken without delay—definite responsibility being imposed upon the Air Council. We would venture, further, to suggest that any executive authority which may be established for the purpose would be greatly assisted if an advisory panel could be formed of gentlemen who have given time and thought, and have expert knowledge of the problems dealt with in our Report, and who could be consulted as occasion demanded by the executive authority on questions arising in the course of its work.

Apart altogether from the mere terms which will bring this war to a conclusion, there are reactions growing which will profoundly alter the circumstances of international relationships with the peace. It is fair to expect that the secrecy of international negotiations will be done away, and with it most of the suspicion which secrecy always arouses; the system of bargain and counter bargain will be largely impossible.

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Such a view of the future must make the claim to aerial sovereignty wear a different aspect from that suggested. The sovereignty of the air is in itself an academic or theoretical question. Each nation must be supposed to have the sovereignty in the air over its territories. The practical question is the only important one. How is the sovereignty to be asserted and exercised? Is each nation to make its own laws and fix its own rules and regulations, and then, by a process of bargaining one with another, to secure concessions and set up a series of more or less favored-nation treaties or conventions, or are the nations as a whole to agree upon some international code of laws, with rules and regulations to follow, to be applied openly and equally among all nations upon some mutually enforceable sanction? If causes of offense are to be removed, the second alternative is the only acceptable one. I think, therefore, that in taking any steps towards the establishment of laws or of rules and regulations for civil aerial transport at this time care should be taken to avoid any commitments which would hinder the adoption of the second alternative at the earliest favorable moment. The door should be left open for the widest possible conference and the most general acceptance.

There are two other selfish reasons for this policy:

(*a*) The strategic position of this country in relation to the air differs fundamentally from the strategic position in relation to the sea. So long as the shores of the North Atlantic are occupied by the leading civilized peoples so long the British position is advantageous as a center of sea power. But if air power is to usurp to any degree the place of sea power—and this seems probable so long as flight over land holds appreciable advantages over flight over sea, which is the case under conditions as they exist today—so the position of a country placed centrally as regards land must be superior to the position of a country placed centrally as regards water. The British Isles are badly placed for aerial communication. Other nations bar the access to the great land masses associated to form the British Empire. A clear right of way free from restriction across France and Italy and Spain is essential to effective progress in intercolonial air communications. Our self-interest, therefore, as a great Power lies towards an international settlement of air sovereignty.

(*b*) And for similar considerations our interest as a commercial and industrial people must lie in the same direction. The right to pass across other national territory without let or hindrance, relief from varying terms and conditions attaching to flight which may be onerous and irksome, the absence of customs restraints or tariff restrictions, and generally the absence of the apparatus for hampering or artificially routing trade are all wanted.

I can only suggest that warlike considerations equally led to the decision to place the control of civil aerial transport with the Air Ministry, whose prime function must be warlike, the conduct of war or of preparations for war. The case for civil control of civil aerial transport was submitted to the Main Committee in the following memorandum (except for some slight amendments):

(*a*) Civil aerial transport cannot be discussed apart altogether from military aeronautics. There must be many aspects which they have in common just as there must be many aspects in which they are opposed. The policy and outlook of the one have no necessary connection with the policy and outlook of the other. The control, therefore, cannot be simple and complete in a single hand.

(*b*) The root principle of any allocation of shares in the control must be to provide separate representation of opposed aspects and policies, to secure adequate and impartial consideration, while at the same time securing common treatment of those aspects and policies which are at one.

(*c*) On the analogy of railways, shipping, canals, tramways, etc., the Board of Trade in its capacity as a Ministry of Communications would be the fitting department of the Government to be concerned with the commercial and civil aspects of aeronautics. On the contrary analogy of the decision of the Main Committee, shipping should be brought under the control of the Admiralty, and railways, roads, and canals under the control of the War Office in times of peace. Such a step could not, I think, be contemplated.

The recent reorganization of the Board of Trade into a Ministry of Commerce and a Ministry of Public Utilities might be carried a stage further, and transport utilities placed together as a definite integral group of the whole, forming a Ministry of Communications, and leaving gas, water, electricity, and other supply services only to be comprised among public utilities.

(*d*) The need for a unified and single control of those matters which are similar in character and purpose applies with equal force here. There are many common considerations relating to the regulation and control of traffic quite apart from the particular means by which the traffic is carried. The Board of Trade has in the course of time built up an organization and practice for dealing with these questions which a slight development would extend to cover aerial transport. Especial reference may be made to such questions as rates and charges, preferences, classification of commodities, efficiency of and necessity for service, accidents and accident prevention, trade agreements, etc., all of which have a commercial bearing rather than a merely technical bearing.

(*e*) The Air Ministry would continue to be responsible for all those aspects of aeronautics, other than commercial, being extended and developed to the best advantage and generally for all technical aspects. Its particular responsibilities would, I think, be properly extended from purely warlike responsibilities to cover:

1. The establishment, maintenance and operation of all aircraft belonging to the State or used for State purposes irrespective of the particular uses to which they are put or the particular Government Departments for which they are worked (*e.g.*, Post Office);
2. The establishment, maintenance and operation of all aerodromes and landing grounds belonging to the State (I would emphasize that the State ownership of aerodromes and landing grounds should be extended liberally beyond bare warlike or strategic requirements);
3. The establishment, maintenance and operation of all auxiliary services essential to aeronautics, such as weather observation and reporting (in conjunction with the Meteorological Office), wireless telegraphy, signaling, distinguishing of routes, etc., because such services must be common to all users of aircraft and can only be effective on a national scale;
4. The ultimate control and responsibility for the central research and experimental station. (It is suggested that, apart from private effort, the Government should establish a central research and experimental station on a large scale and fully equipped to meet all the needs of the industry and the State under a representative constitution.)

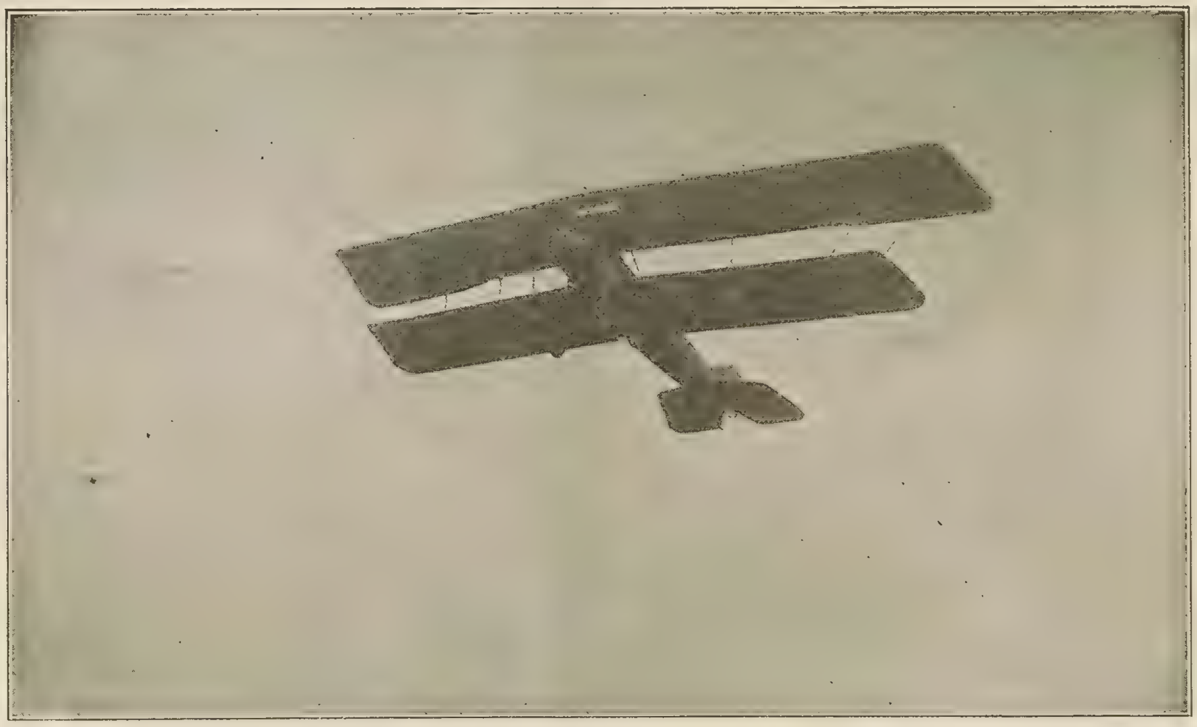
(*f*) In addition to the purely commercial questions the Board of Trade would appear to be the proper Ministry to be responsible for

1. The licensing of aircraft and pilots;
2. The investigation of accidents relating to aircraft employed for civil use;
3. The establishment of rules and regulations for aerial traffic, including safety requirements for passenger services;
4. The licensing and inspection of aerodromes and landing grounds not belonging to the State.

The Air Ministry would adopt the rules and regulations of the Board of Trade in connection with State-owned aircraft and aerodromes. The rules and regulations for aerial navigation and conduct generally would be a joint undertaking. The technical inspecting officers of the Board of Trade would be presumably seconded from the Air Ministry. A close relationship of the two would necessarily exist.

(*g*) Finally, the administration of the law and the prosecution of offenses against the rules and regulations for aerial navigation or aerial traffic would be carried out by or under the supervision of the Board of Trade.

Experience in the present war has shown that many factories and industrial plants ordinarily engaged upon work of a useful and wealth-producing character can be adapted to the production of aircraft or parts of aircraft when occasion compels. It is, therefore, strongly urged that a proper scheme should be worked out for the coordination of such factories and industrial plants as are suitable to an enlarged production beforehand, so that the change-over on the outbreak of war may for the future be instantly effective. For this purpose it may be that modifications should be introduced in the lay-out and tool equipment which while not seriously prejudicial to the tasks of peace, would enhance efficiency for the tasks of war. Reserves of tools, patterns, jigs, drawings, etc., should be held in readiness against the day of change, and should be constantly overhauled and kept up to date.



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Up to Dec. 27, 1918, a Total of 13,241 Planes Had Been Shipped, as Shown by the Accompanying Table

With the signing of the armistice, a reliable and intimate view of the United States aircraft program has been made possible in detailed figures authorized by the Production Division of the Bureau of Aircraft Production.

These figures show that up to Nov. 11, a total of 33,384 planes of all kinds had been ordered; that subsequent to that date orders for 19,628 planes were cancelled, and that on account of the uncancelled orders, or 13,756, there had been shipped up to Dec. 27 a total of 13,241. Details are given in the table below:

A study of the table discloses that the orders were distributed among manufacturers as follows: Dayton-Wright Airplane Co., 5,400; Fischer Body Corp., 6,900; Standard Aircraft Corp., 2,210; Wright-Martin Aircraft Corp., 50; Liberty Iron Works, 300; Canadian Aeroplane Co., 680; United States Aircraft Corp., 50; Curtiss Aeroplane and Motor Corp., 11,919; Fowler, Howell & Lesser Co., 225; Springfield Aircraft Corp., 1,475; St. Louis Aircraft Corp., 650; Thomas-Morse Aircraft Corp., 1,150; Breese Aircraft Co., 300; Packard Motor Car Co., 1,025; Brewster & Co., 500; Glenn L. Martin Co., 50, and Sturtevant Co., 500.

It also reveals the following distribution of cancellations: Liberty Iron Works, 100; Curtiss Aeroplane & Motor Corp., 7,898; Fowler, Howell & Lesser Co., 100; Springfield Aircraft Corp., 850; St. Louis Aircraft Corp., 200; Thomas-Morse Aircraft Corp., 553; Standard Aircraft Corp., 1,085; Dayton-Wright Airplane Co., 1,896; Fischer Body Corp., 4,900; Packard Motor Car Co., 1,000; Brewster & Co., 500; Glenn L. Martin Co., 46; Sturtevant Co., 500.

Four companies were unaffected by cancellation orders, viz., Wright-Martin Aircraft Corp., Canadian Aeroplane Co., United States Aircraft Corp., and Breese Aircraft Co.

Type.	Manufacturer.	Total quantity ordered to Nov. 11, 1918.	Quantity left on order after armistice cancellations.	Total shipped to Dec. 27, 1918.
J-1	Dayton Wright Airplane Co.	400	400	400
	Fischer Body Corp.	400	400	400
	Standard Aircraft Corp.	750	750	750
	Wright-Martin Aircraft Corp.	50	50	50
	Total	1,600	1,600	1,600
JN4-D	Liberty Iron Works	300	200	200
	Canadian Aeroplane Co.	680	680	680
	U. S. Aircraft Corp.	50	50	50
	Curtiss Aeroplane & Motor Corp.	2,401	2,002	2,002
	Fowler, Howell & Lesser Co.	225	125	125
	Springfield Aircraft Corp.	975	625	536
	St. Louis Aircraft Corp.	650	450	450
	Total	5,281	4,132	4,043
JN-H Training	Curtiss Aeroplane & Motor Corp.	402	402	402
Gunnery	Curtiss Aeroplane & Motor Corp.	427	427	427
Bombing	Curtiss Aeroplane & Motor Corp.	100	100	100
	Total	929	929	929
G-1	Curtiss Aeroplane & Motor Corp.	560	560	471
G-2	Curtiss Aeroplane & Motor Corp.	90	90	90
JN6-H Observation	Curtiss Aeroplane & Motor Corp.	106	106	100
Pursuit	Curtiss Aeroplane & Motor Corp.	125	125	125
Bombing	Curtiss Aeroplane & Motor Corp.	154	154	154
	Total	1,035	1,035	940
B Gnome	Thomas-Morse Aircraft Corp.	100	100	100
S-4	Thomas-Morse Aircraft Corp.	50	50	50
C LeRhone	Thomas-Morse Aircraft Corp.	1,000	447	447
	Total	1,150	597	597
Penguin	Breese Aircraft Co.	300	300	300
E-1 (M Defense)	Standard Aircraft Corp.	30	30	30
	Standard Aircraft Corp.	430	98	96
	Total	460	128	126
DH-4	Dayton-Wright Airplane Co.	5,000	3,104	2,899
	Fischer Body Corp.	4,000	1,600	1,599
	Standard Aircraft Corp.	500	140	89
	Total	9,500	4,844	4,587
Handley-Page	Standard Aircraft Corp.	500	107	102
SE-5-A	Curtiss Aeroplane & Motor Corp.	54	54	9
	Curtiss Aeroplane & Motor Corp.	1,000	1	1
	Total	1,054	55	10
Lusac-11 (Le Pere)	Packard Motor Car Co.	1,025	25	7
	Brewster & Co.	500	0	0
	Fischer Body Corp.	2,000	0	0
	Total	3,525	25	7
Martin Bomber	Glenn L. Martin Co.	50	4	0
USD-9 A	Curtiss Aeroplane & Motor Corp.	4,000	0	0
Caproni	Fischer Body Corp.	500	0	0
	Curtiss Aeroplane & Motor Corp.	500	0	0
	Total	1,000	0	0
U.S.B.1	Curtiss Aeroplane & Motor Corp.	2,000	0	0
VE-7	Sturtevant Co.	500	0	0
	Springfield Aircraft Corp.	500	0	0
	Total	1,000	0	0

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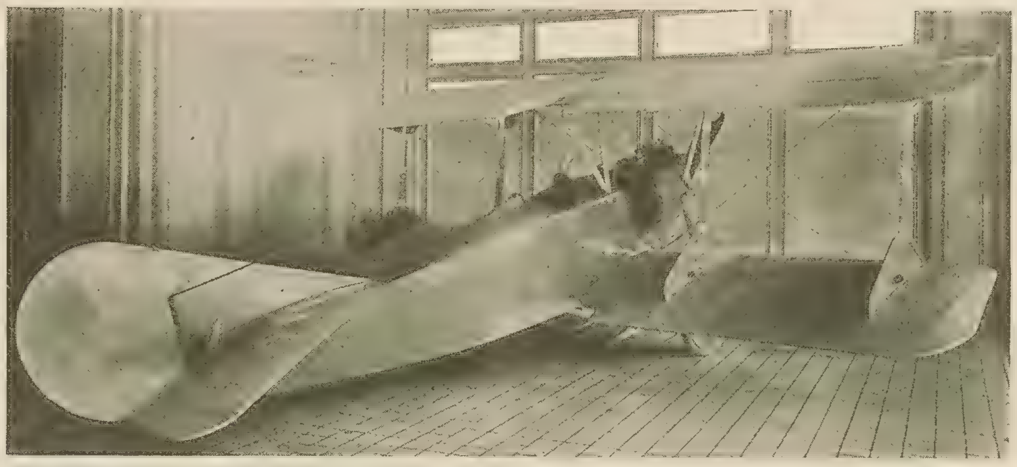

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General Squier Tells of Air Achievements

(*Continued from page 3*)

fighter, equipped with the 300 h. p. Hispano-Suiza engine.

The Flying Boat NC-1

"One of the most striking accomplishments of the United States in airplane design has been the development by the Navy of the Naval Seaplane or Flying Boat NC-1. This plane has a central float forty-six feet long, a wing span of 126 feet and a total wing area of 2400 square feet. This plane is equipped with three Liberty engines with tractor screws. Fully loaded the plane weighs 22,000 pounds. The weight empty with water is 14,000 pounds.

Major Gen. George O. Squier, S. C.
Photo J. Norman Alley

Production of Helium

"One of the greatest scientific achievements of the present war from a technical standpoint is the production of helium in balloon quantities. This gas is non-inflammable and has about ninety-two per cent of the buoyant effect of hydrogen. Its pre-war scarcity may be appreciated from the fact that, up to two years ago, not more than 100 cubic feet ever had been obtained, and the usual selling price was about $1,700 a cubic foot.

"Notwithstanding so discouraging an outlook, some one in the British Admiralty had imagination enough to propose the large scale separation of helium from certain natural gasses in Canada, that contain about one-third of one per cent of it, and experiments were undertaken at the University of Toronto. Soon after the entry of the United States into the war, the Bureau of Mines, learning of the problem from a British confidential memorandum, persuaded the Signal Corps and the Bureau of Steam Engineering of the Navy to approve and finance jointly an experimental program on a large scale. Thanks partly to the unusually rich sources in this country, and partly to the skill of the two commercial companies whose services were enlisted and to the enthusiasm of the Bureau of Mines Staff and of Mr. Carter, of the Navy, who for a time represented the Army as well in the project, such success was achieved that, at the cessation of hostilities, there was compressed and on the docks ready for floating 147,000 cubic feet of nearly pure helium, and plants were under construction to give at least 50,000 cubic feet a day at an estimated cost of not more than ten cents a cubic foot. The production of a balloon gas that assures safety from fire opens up a new era for the dirigible balloon. With a non-inflammable gas, not only comfortable and expeditious, but also safe transcontinental and transatlantic travel in dirigibles will, it is believed, soon be commonplace.

Course of Winds Determined

"Under the effective direction of Major W. R. Blair, one of the most experienced aerologists of the United States, commissioned for the service from the Weather Bureau, about twenty upper air stations were established in France and England and a forecast based on data furnished by these stations made regularly to the A. E. F. The use which such forecasts may serve, both in connection with the aviation mail service and ultimately with the transatlantic service, may be seen from the fact that above the level of 10,000 feet, ninety-five per cent of the winds in both the United States and Europe are from west to east. . . .

Ground Training for Fliers

"While it was not possible to arrive at exact percentages, estimates made at the time of our entrance into the war, based upon information from Italy, France and Great Britain, indicated that not more than two per cent of the aviation losses in active service were caused by the enemy. Failures of the airplanes were responsible for only slight losses, due, of course, to the rigid inspection of the machines. Statements from all sources agreed that of the total number of fliers permanently out of the flying service, not more than eight per cent could be attributed to mechanical shortcomings of the airplane or engine. The remaining ninety per cent loomed large when it was realized that this proportion represented trouble in the flier himself. Within the last few months an apparatus has been perfected whereby students may acquire flying experience and training without leaving the ground. This machine, known as the Ruggles Orientator, is a modification of the universal joint, composed of three concentric rings so pivoted within the innermost ring, to be put through every possible evolution experienced in actual flying, except forward progression. . . .

Plane Radiophone

"The application to radio inter-communication of the vacuum tube—perhaps more properly called the thermionic tube or bulb—is one of the most interesting developments in the whole field of applied science. For not only has it made possible what has been justly heralded as one of the most spectacular achievements of the whole war—the airplane radiophone. The most striking use made of vacuum tubes prior to the time we entered the war was the transmission of speech by radio from Washington to Paris and Honolulu, during the experiments carried out by the American Telephone and Telegraph Company and the Navy Department. Vacuum tubes were used as the radio frequency generator for transmitting, and for detector and amplifier in receiving. . . .

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"The general principles which governed in the making of this enterprise in all of its ramifications of material and personnel, and to which the success attained must be attributed, may perhaps be formulated as follows:

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Sergt. Fred C. Graveline, A. S.

Sergt. (First Class) Fred C. Graveline, 20th Aero Squadron, first day bombardment group (A. S. No. 20083). For repeated acts of extraordinary heroism in action near Villers-Devant-Dum, France, and Mouzon, France, Sept. 29 and Nov. 5, 1918. Volunteering to act as observer and aerial gunner because of the shortage of officer observers, Sergt. Graveline started on seventeen bombing missions, successfully reaching his objective on fourteen of these expeditions, shooting down two enemy aircraft. On two occasions, while flying in the rear of his formation, he drove off superior numbers of German machines. Home address, Mrs. Josephine Graveline, wife, 537 Main street, Springfield, Mass.

Capt. Christopher W. Ford, A. S.

Capt. Christopher W. Ford, Air Service, 103 Aero Pursuit Squadron. For repeated acts of extraordinary heroism in action near Rheims, France, March 27, 1918, and near Armentieres, France, May 21, 1918. Near Rheims on March 27, Captain Ford, while on a patrol with two other pilots, led his formation in an attack on eight enemy planes. After 20 minutes of fighting the American formation shot down three German machines, of which one was destroyed by this officer. Near Armentieres on May 21 he again led a patrol of six planes in attacking twenty enemy aircraft. The attack resulted in ten individual combats. Captain Ford shot down one hostile plane and with his patrol routed the others. Home address, Mrs. Harriet Chuff, aunt, 462 West One Hundred and Thirty-first street, New York City, N. Y.

First Lieut. Edward B. Cutter, A. S.

First Lieut. Edward B. Cutter (deceased), 19th Aero Squadron. For extraordinary heroism in action near Cunel, France, Oct. 21, 1918. Responding to an urgent request for a plane to penetrate the enemy lines to ascertain whether or not the enemy was preparing a counter-attack, Lieut. Cutter immediately volunteered for the mission. Obliged to fly at a very low altitude on account of the unfavorable weather conditions, he was under terrific fire of the enemy at all times; by skillful dodging he managed to cross the enemy lines. His plane was seen to suddenly lurch and crash the short distance to the ground, both he and his observer being killed. Home address, Mrs. Mary S. Cutter, mother, Anoka, Minn.

First Lieut. Willis A. Diekema

First Lieut. Willis A. Diekema, pilot, Air Service, 91st Aero Squadron. For extraordinary heroism in action in the region of Metz, France, Sept. 15, 1918. While on a photographic mission Lieutenant Diekema's formation was attacked by a superior number of enemy aircraft. In the course of the combat Lieutenant Dickema's companion planes were driven off. Disregarding the fact that his machine was without protection, he continued on his mission until his observer, Lieutenant Hammond, had completed the photographs. On the return they fought their way through an enemy patrol and destroyed one of the machines. Home address, G. J. Dickema, 134 West Twelfth Street, Holland, Mich.

First Lieut. Leonard C. Hammond

First Lieut. Leonard C. Hammond, observer, Air Service, 91st Aero Squadron. For extraordinary heroism in action in the region of Metz, France, Sept. 15, 1918. While on a photographic mission Lieutenant Hammond's formation was attacked by a superior number of enemy pursuit planes. Notwithstanding that the enemy planes succeeded in driving off the protecting planes, Lieutenant Hammond and his pilot, Lieutenant Dickema, continued on alone. Continually harassed by enemy aircraft, they completed their photographs, and on the return fought their way through an enemy patrol and destroyed one of the machines. Home address, A. B. Hammond, 2252 Broadway, San Francisco, Cal.

Second Lieut. William O. Lowe

Second Lieut. William O. Lowe, third observation group. For extraordinary heroism in action east of Cunel, Verdun sector, France, Oct. 7, 1918. Lieutenant Lowe, while staking the advance lines of the 80th Division, was suddenly attacked by a formation of eight enemy machines (Fokker type), which dived out of a cloud bank. Although greatly outnumbered, Lieutenant Lowe succeeded in shooting down one out of control and disabled a second so that it was forced to land. Later, on the same mission, he was again attacked by a patrol of five enemy scout machines, and in a running fight he drove these off and successfully completed his mission. Home address, Mrs. Jessie G. Lowe (mother), general delivery, Fountain City, Tenn.

Second Lieut. Wilbert E. Kinsley

Second Lieut. Wilbert E. Kinsley, Air Service, pilot, third observation group. For extraordinary heroism in action east of Cunel, Verdun sector, France, Oct. 7, 1918. While staking the advanced lines of the 18th Division he was attacked by eight enemy machines (Fokker type), who dived out of a nearby cloud bank. Although attacked simultaneously by the enemy planes, he placed his airplane in such position that his observer, Second Lieut. William O. Lord, was able to shoot down and crush one enemy plane and disable a second so badly that it was forced to land a few kilometers inside the German ines. Later, on the same mission, he was again attacked by a patrol of five enemy scout machines and in a running fight he drove these off and successfully completed his mission. Home address, Guy Kinsley (brother), Washington Street, Winchester, Mass.

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Personals

Major Ralph P. Cousins has been relieved from the command of Roosevelt Field, and appointed to the command of Payne Field.

Major Harley W. Lake is ordered from Washington to McCook Field for duty. Major Lake has been the representative, at the headquarters of the Division of Military Aeronautics, of the Technical Section since its removal to Dayton.

Major Robert A. Strong, M. C., is ordered from Kelly Field to duty in the office of the attending surgeon, office of the Surgeon General of the Army, at Washington.

Major Kinsley Twining has been honorably discharged from the Air Service, Production. The discharge goes into effect on Jan. 15. Major Twining was commissioned in the Bureau on March 20, 1918.

Major Percy E. Van Nostrand is announced as a junior military aeronaut, with rating from Sept. 1, 1918. Major Van Nostrand was formerly adjutant of Kelly Field, and is at present attached to the Balloon Section, D. M. A.

Capt. Paul Pleiss, Air Service, A. E. F., has been appointed to the grade of major, with rank from Sept. 10, 1918.

Second Lieut. Arthur C. Thomsen, Aviation Section, S. R. C., has been honorably discharged from the service.

Major Percy E. Van Nostrand, S. C., Major Arthur Boettcher, J. M. A., Air Service, Aeronautics, and Major Adolph B. Linquest, M. C., are members of a board of officers appointed to meet at Fort Omaha to determine the qualifications of officers for rating as military aeronauts, or junior military aeronauts.

Announcement is made of the following appointments in the Air Service, Aeronautics, A. E. F.: To be Lieut. Cols.—Majors George W. De Armond and Edwin V. Sumner. To be captains—First Lieuts. Lester H. Spalding, Leonard Work, Carlos E. Grevenberg and William G. E. Tytus. To be First Lieut. —Second Lieut. Keith Jones.

Col. Ralph C. Caldwell, A. S., A., is transferred from Camp Travis to the Army Balloon School, Fort Omaha, for duty.

Signor Guiseppe Bevione and Lieutenant Calliano, attached to the Italian Military Mission for Aeronautics, were entertained at dinner at the Cafe Sovrani, Washington, D. C., recently by members of the Italian Military Mission and the Italian Bureau of Public Information in recognition of their forthcoming return to Italy.

The name of Lieut. Roy B. Mosher, A. S., was incorrectly printed in a list of Air Service Association members published by the AIR SERVICE JOURNAL.

Flying Fields

Scott Field

Lieut. Thos. H. Baskin, officer in charge of the Post Exchange and formerly Flight Commander at Scott Field was married on Christmas Day to Miss Evelyn Keady of Minneapolis. The wedding took place in Milwaukee.

Official authority from the War Department has been received by Major Abbey, Commanding Officer, to discharge 99 men from the Flying School Detachment at Scott Field. Lieut. T. T. Shannon, Personal Adjutant, has been placed in charge of the work of discharging these men.

Eleven officers will be retained throughout the winter, and all over that number will either be discharged or transferred to other fields.

Colonel Robins, formerly Officer of Scott Field, was recently at the field on inspection. He was accompanied by Major Oscar Yarnell and Major N. L. King and Lieutenant McIlvane. They remained at the field for three days.

Camp John Wise

During the week ending Jan. 2, sixty officers were released from the service at Camp John Wise.

Second Lieut. H. R. Hall, Camp Aeronautical Information Officer, camp mess officer, and editor of the *Balloon Pilot*, has been assigned as Commanding Officer of the 40th Balloon Company, relieving Savius T. Christian. Second Lieut. Ralph L. Milnes has been assigned as Commanding Officer of the 98th Balloon Company.

Decorate Seventeen American Fliers

Seventeen American aviators were decorated at Coblenz Jan. 12 for deeds of heroism, some of which were performed during the fighting around Château Thierry in July. The French army authorities took advantage of the opportunity to bestow the medals which they had awarded. The recipients were from the 12th, 94th and 91st Aero Squadrons.

One of those decorated was Lieut. L. H. Brereton, of Washington, D. C., and his observer, Capt. Elmer R. Haslett, of Los Angeles. Both Brereton and Haslett were given the Distinguished Service Cross and the French War Cross.

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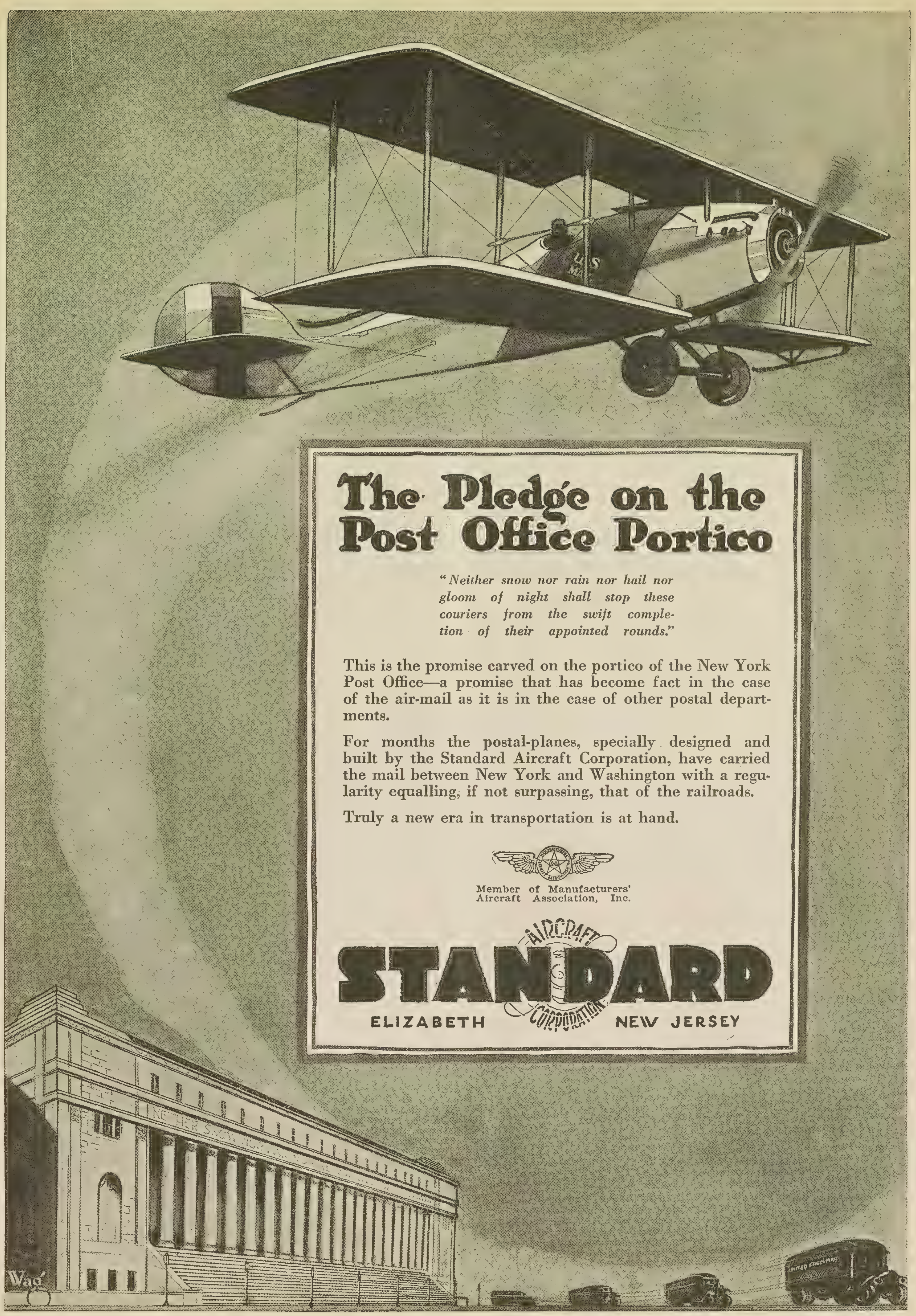

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AIR SERVICE JOURNAL

The National Aeronautic Newspaper

VOL. IV. No. 4 NEW YORK, JANUARY 25, 1919 PRICE 10 CENTS

SMITHSONIAN INSTITUTION LANGLEY AERONAUTICAL LIBRARY

Smithsonian Institution JAN 25 1919

Imperative Demand for the Prompt Issuance of Civilian Licenses

Air Development is Being Greatly Retarded

NO RULING AS YET

Deadlock Which Will Cause the Loss of Many Months

Bill Introduced by Congressman Smith

TO OBTAIN ACTION

Power Invested in a Specially Created Committee

The Joker in the Sales Contract

Charles B. Smith, United States Congressman from New York, introduced in the House, on Jan. 17, a bill (H. R. 14626) providing for the creation of an aircraft licensing board.

This board would consist of three members to be appointed by the Secretary of Commerce, and would control the licensing of aircraft for commercial purposes.

The bill was referred to the Committee on Interstate and Foreign Commerce. It is understood to have the support of the aeronautic world generally and should receive prompt action by Congress.

Commercial and Military Aeronautics

With the Joint Army and Navy Board for Aeronautic Cognizance having refused to modify the strictures on private flying, though the army and navy forces, including the Air Service, are fast being demobilized, and the necessity for their continuance in full force more than two months after the cessation of hostilities is not apparent, will it not be a good move in the interest of all concerned to divorce absolutely commercial from military aeronautics?

That is practically what Representative Smith's bill, if passed, would do—put aeronautics as a commercial proposition on its own footing in peace times, and yet protected by careful licensing against unskilled pilots, improper equipment, or whatever would militate against the development of aircraft for business uses.

Time for Action

If there is to be any development of sporting or commercial flying during the coming summer, the question of licenses for aviators and passengers must be settled in the near future. At the present time it is almost impossible for a civilian to secure a license to fly.

The Joint Army and Navy Board on Aeronautic Cognizance, acting on the Presidential proclamation of Feb. 28, 1918, has refused to grant licenses to civilians and it is difficult now to get a definite ruling as to when the skies are to be opened for free air travel.

The President's Proclamation

The Presidential Proclamation in question, dated Feb. 28, 1918, and made public on March 4, 1918, reads as follows:

Whereas, the United States of America is now at war, and the Army and Navy thereof are endangered in their operations and preparations by aircraft, I, Woodrow Wilson, President of the United States, by virtue of the authority vested in me by the Constitution as Commander-in-Chief of the Army and Navy of the United States and of the Militia of the several States when called into the actual service of the United States, do hereby, for the protection of such forces, issue the following proclamation:

I. A license must be obtained from the Joint Army and Navy Board on Aeronautic Cognizance by or in behalf of any person who contemplates flying in a balloon, airplane, seaplane, or other machine or device over or near any military or naval forces, camp, fort, battery, torpedo station, arsenal, munition factory, navy yard, naval station, coaling station, telephone or wireless or signal station, or any building or office connected with the National Defense, or any place or region within the jurisdiction or occupation of the United States which may be designated by the President as a zone of war-like operations or of war-like preparation.

II. The license will specify the person to whom it is issued, the machine to be used, the persons to operate the machine and all other persons to be carried therein, the mode of marking or otherwise identifying the machine, and other details intended to assure the military and naval forces of the peacefulness of the errand.

III. The license will also specify the territory and the time wherein it shall be available.

IV. In case any aircraft shall disregard this proclamation or the terms of the license, it shall be the right and duty of the military or naval forces to treat the aircraft as hostile and to fire upon it or otherwise destroy it, notwithstanding the resultant danger to human life.

V. For the present, the President designates as a zone of military operations and of military preparation the whole of the United States and its territorial waters and of the insular possessions and of the Panama Canal Zone.

VI. The provisions of this proclamation do not apply to aircraft operated by the Army or Navy of the United States.

VII. No private flying without a license will be permitted after the expiration of thirty days from the date of this proclamation.

Delay That Is Destructive

One of the difficulties of the situation is the frankly expressed wish of the Army to control the granting of such licenses. All other branches of the government oppose this stand and a deadlock seems to have been reached which is setting back aviation in this country many months more than the actual time which already has been lost.

Constructors who would build sport and commercial airplanes hesitate to proceed until a definite position is taken on the licensing matter. The government is thus not only discouraging all constructors; even the testing of experimental machines is prohibited unless they are destined for use with the Army or Navy.

A similar proclamation regarding aeronautical exhibitions has been annulled by executive order in order to permit the holding of the show this year. Action on this matter is so vital that unless something is done soon there will be a great danger of the aeronautical industry lapsing into the small experimental business that it was before the war.

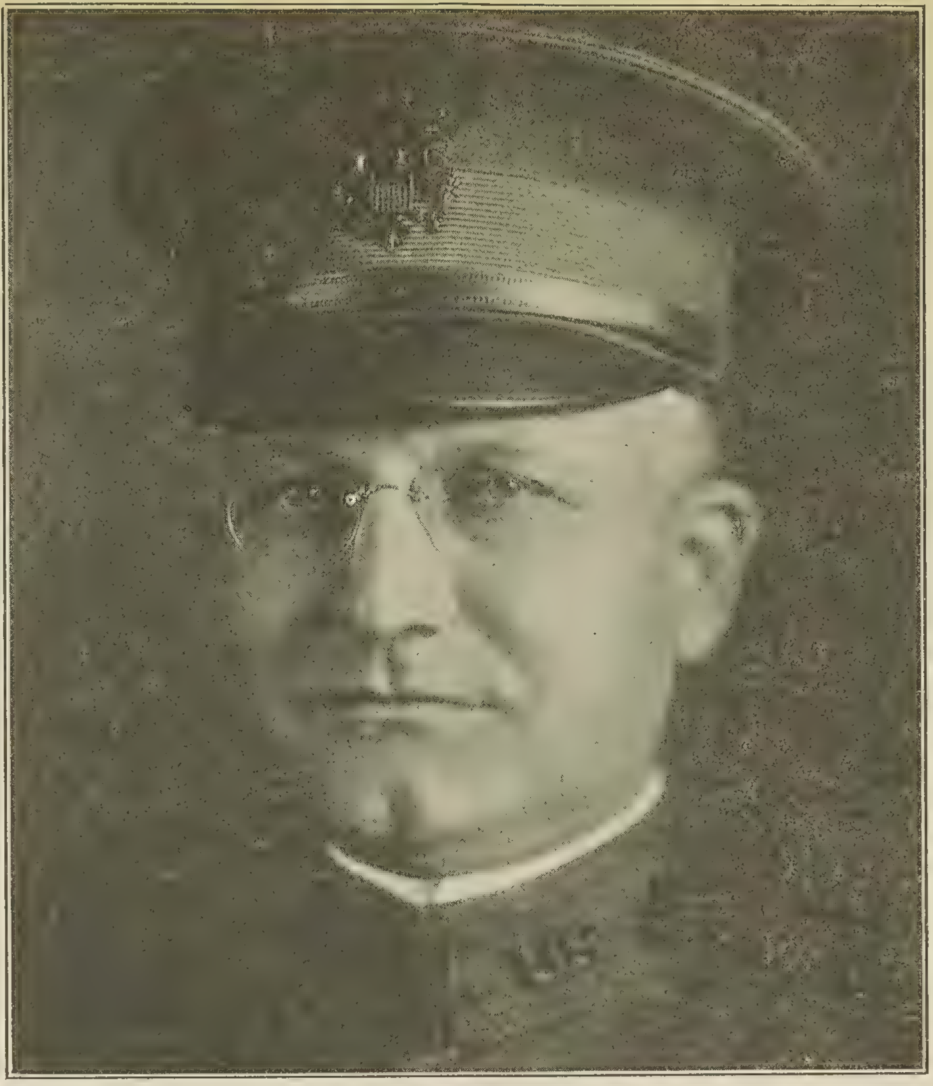
Abroad the matter has been given exhaustive study and is in a way to be settled at an early date. Congress or the executive must take some action on this all important matter to prevent a serious condition arising in aeronautics.

COL. E. A. DEEDS IS EXONERATED BY GEN. S. T. ANSELL

Recommendation Against a Trial by Court Martial

SECRETARY BAKER APPROVES

Army Report Declares: "There Was a Total Absence of Intent to Deceive"



Towle Studio

Col. E. A. Deeds

Colonel Deeds' entrance into the field of aviation was mainly due to his friendship for Orville Wright and his desire to see Dayton, the birthplace of the aeroplane, become an aeronautical manufacturing center. While starting a company for this purpose he was called to Washington by Howard Coffin who desired him to put his business experience at the Government's disposal.

Colonel Deeds agreed to give up his business and has given his services to the upbuilding of the aircraft program. His advice was always relied on by General Squier, and he occupied until the Aircraft Production investigation a most important position in the Air Service.

Secretary Baker announced on Jan. 16 the exoneration of Colonel Edward A. Deeds of the Signal Corps of the charges made against him in Charles E. Hughes' report on aircraft production. The Secretary made public the report of the Special War Department Board of Inquiry recommending that Colonel Deeds should not be tried by court-martial, as recommended in the Hughes report.

Secretary Baker has approved the war board's report and ordered the case closed. At the same time the Secretary, in view of the wide publicity attached to the acts of Colonel Deeds, sent to Chairman Dent of the House Military Committee a letter stating that the record of the inquiry made by Acting Judge Advocate General S. T. Ansell had been approved unanimously by the Board of Review, composed of Judge Advocates Read, Millar, Tucker and Keedy, and asking that the full report, by which Colonel Deeds is exonerated, be spread in the *Congressional Record.*

Secretary Baker's Letter

Mr. Baker's letter reads:

January 16, 1919.

Chairman Committee on Military Affairs, House of Representatives.

My Dear Sir: Upon the submission to the President of the report of the Hon. Charles E. Hughes and the report of the Attorney General covering the aircraft investigation, I directed that the specific recommendations contained in these reports be extracted for my consideration and for such action by me as might be required in the premises. These extracts were referred to the Judge Advocate General of the Army directing a thorough and comprehensive inquiry into the allegations affecting the conduct of Colonel Deeds. He was directed, not only to review all evidence taken by Judge Hughes, which the Attorney General kindly made available, but to secure all other facts obtainable in this case.

The Judge Advocate General committed the matter to a board of review, consisting of officers of high ability and character wholly disassociated from any previous business or personal relations either with Colonel Deeds or with any matters affecting aircraft production. This board carefully and systematically examined all of this evidence and obtained all possible additional facts, and its conclusions are, therefore, based upon fuller inquiry than was found possible within the time and opportunities at the disposal of Judge Hughes, and this examination is in effect the accomplishment of the thorough inquiry which Judge Hughes had in mind when he suggested that these transactions be examined by a court martial. The purpose of Judge Hughes' suggestion is therefore accomplished.

The unanimous report of this board of review, approved by the Acting Judge Advocate General, recommends that Colonel Deeds be not tried by court-martial on any of the grounds suggested and this recommendation has been approved by me.

Colonel Deeds was one of a large group of men who came to Washington at great personal and pecuniary sacrifice to render service to the Government in the great emergency caused by our participation in the war.

My duty as Secretary of War, with regard to any public servant under my jurisdiction, is clearly to bring about proper punishment for wrongdoing and equally clearly to protect those public servants whose conduct is faithful and upright against embarrassment, humiliation or loss.

Very wide publicity has been attached to the acts of Colonel Deeds as a member of the Aircraft Board, it will ever be possible to overtake the judgments which have been formed upon partial information on this subject, I do not know, but this department will make every effort to secure the widest publicity for the action now taken and for the grounds upon which it rests.

To carry this into effect, I am therefore transmitting to your committee for its information, and with the request for its publication in the *Record*, if the proprieties of the situation permit, a copy of the report of the Judge Advocate General. Similar copies are being furnished the Chairman, the Committee on Military Affairs, United States Senate, the Attorney General, and Colonel Deeds.

Inasmuch as the purpose of Judge Hughes' suggestion has been accomplished, I have directed that all the records in this case be filed in the War Department and that this matter be considered as closed.

Cordially yours,

Newton D. Baker,
Secretary of War...

Gave Up a Large Income

The report of General Ansell just made public, covers about 10,000 words, and is a detailed consideration of the points raised by Judge Hughes, as well as of several other points submitted by Secretary Baker to the Judge Advocate General's office for investigation with a view of determining whether Colonel Deeds should be court-martialed.

One of the interesting features of the report is that section which deals with the business associations of Colonel Deeds, who before his appointment as Colonel in the Signal Corps had served the Government in a civilian capacity as a war worker, receiving a nominal salary of a dollar a year.

"In the early part of 1917," says this part of the report, "Mr. Deeds was a man of wealth, well known in the field of aircraft development. He was a large holder of stock in the Dayton Metal Products Company, which had profitable contracts with the British Government and other contracts with the United States Navy Department, and which had accumulated a considerable surplus in its treasury.

"Mr. Deeds was Vice President of the company, receiving $25,000 a year. He had also been a large stockholder in what was known as the Delco Company, the stock in which, owned by him and his associatees, had been sold to the United Motors Company for several millions of dollars in cash, and, in addition, stock in the company. He was President of the latter corporation, drawing a salary of $60,000 a year. He was also largely financially interested in the Domestic Building Company, building in Dayton, Ohio, subsequently acquired by the Dayton Wright Airplane for its principal airplane plant. On April 9, 1917, the Dayton Wright Airplane Company was incorporated, taking over the Orville Wright Airplane Corporation, in which Deeds had also been financially interested before that time.

"Deeds was an incorporator of the Dayton Wright Airplane Company, in which he had intended to become a stockholder, and of which he intended to become Vice President, until his plans were changed because of his subsequent connection with the Government."

The first allegation against Colonel Deeds considered by General Ansell was the telegram of Sept. 16, 1917, sent by Colonel Deeds to H. E. Talbott, a former business associate, at Dayton. Concerning this the finding of General Ansell says:

"It appears that, while Colonel Deeds's real endeavor was to aid the Government in expediting its program of aircraft production, through some mistaken notion he deemed it proper to accomplish that object by a species of deceit which would result in concealment of the source of the information which the telegram conveyed. This was not only foolish, but provocative of the severe criticism which has been visited upon him in a manner unjustly.

"Upon the evidence now before this office, however, court-martial proceedings against Colonel Deeds, based upon this transaction, are not advised. (1) No fraud against the Government nor disclosure of confidential information was intended; (2) none was accomplished; (3) the purpose of the telegram was to expedite the earnest efforts which the Government officials were making to speed up airplane production."

Sees No Attempt to Deceive

The second charge against Colonel Deeds covered his statement regarding transfer of stock in the United Motors Company. After discussing this in detail, the Ansell report says:

"The whole attitude of Colonel Deeds from the time he was first approached with the request that he give the Government the benefit of his services, up to the time when the invesigation was commenced, taken in connection with his large financial sacrifices in relinquishing salaries aggregating $85,000 a year, as well as interests in the various companies with which he had been connected, precludes the thought that he was guilty of conduct unbecoming an officer and a gentleman.

"It is recommended that no court-martial proceedings be instituted against Colonel Deeds based upon the statements in his letters to the Secretary of War and the Aircraft Production Board so far as they concerned the transfer of his stock in the United Motors Company, because (1) Colonel Deeds at the date the letter was written had made an informal gift of the stock; (2) he had instructed Judge McCann to arrange promptly the necessary transfer; (3) the actual transfer was delayed because of Colonel Deeds's absence from Dayton, necessitated by his continuous and unremitting labor for the Government at Washington; (4) the formal transfer was subsequently made; (5) there was a total absence of intent to deceive."

Ryan Commended Officer

The Ansell report ends with the statement that the conclusion reached by the Judge Advocate General's office finds confirmation in this extract from a letter written on Nov. 13, 1918, to Secretary Baker by John D. Ryan, then Director of the Air Service:

"I feel, as I stated in a former letter to you, that Colonel Deeds performed a great service in expediting the work on the Liberty motor. If he had followed strict regulations and kept within them in the expenditure of money for the production of the first of these model engines, we would probably not have had any quantity production yet.

"I feel that the patriotic service rendered to the Government and the sacrifices made in connection therewith by Colonel Deeds outweighed any technical violations that might have occurred, and considering the conditions under which this work had to be done, if the aircraft was to take any part in the war within a reasonable time, I think commendation instead of court-martial should be Colonel Deeds's reward."

AIR SERVICE
JOURNAL

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WINS $5,000. BY LANDING ON A ROOF

French Aviator Alights Safely Atop the Galleries Lafayette

SHOUTS: "THERE YOU ARE"

Jules Vedrines Says He Never Had the Slightest Doubt About the Success of His Flight in Paris

Jules Vedrines, the French aviator, won a prize of $5000 for being the first airman to land on the roof of a house during a flight.

Vedrines left Issy les Moulineaux at 1:20 o'clock in the afternoon of Jan. 19, notwithstanding a thick fog, to attempt a landing on the roof of the Galleries Lafayette, a large department store near the St. Lazaire station, Paris. The roof, which is wide and long and without obstructions on it, had previously been proposed for use as an aerial station in Paris.

Vedrines flew over the boulevards and slowed down as he passed over the bank building, opposite his destination. Here the aviator shut off the power of his engines and skimmed the parapet surrounding the roof by only a few inches. The landing was a spectacular one, and although the machine was slightly damaged Vedrines was uninjured. When the machine came to a standstill Vedrines waved his arms to a spectator on the bank roof, yelling, "There you are."

The roof is approximately 46 feet in width and in length about 82 feet. The width of the airplane used by Vedrines is 39 feet.

After the flight and the successful landing Vedrines said he never had the slightest doubt about its success. He added that he intended to fly around the world.

A well-known pilot, speaking of M. Jules Vedrines' feat, said:

"An airplane has no brakes, there is nothing to stop it except the medium it flies in—the air. The pilot must stall his machine a few feet from the roof by pulling her nose up until the under surfaces of his planes present such a flat surface that the resistance of the air stops the machine, and it loses flying speed. The machine will then fall with very little forward speed for a height of five or ten feet. We call this a 'pancake' landing, and it is always used when making a difficult landing, either in a ploughed field or tall grass.

"There is always the chance in bringing a machine into a difficult place like this that the pilot, in his anxiety to lose his flying speed in time so that his machine can land without running the full length of the roof or field, will stall a machine too soon. The danger in this instance is great, as the machine will fall the mment it loses its speed and will crash in the street below."

Vedrines has a long record of exceptional achievements as an aviator. Probably his most notable performance was the winning of the race from Paris to Madrid in 1911. He was, also, the second air pilot to fly from Paris to London.

Harris & Ewing

Col. G. C. Brant

Serving in '98 as a volunteer and at the Military Academy at West Point from 1899 to 1904, was the start of Col. G. C. Brant's military career. From 1904 to 1916 he served with the 7th, 9th, 10th and 15th regiments of cavalry, being successively promoted to Captain in 1916 and Major in 1917 during five years in the Philippines and two years on the Mexican Border.

He was transferred to the Air Service on Aug. 5, 1917, and was on duty at Kelly Field until January, 1918, having been promoted while there to the grade of Lieutenant-Colonel. His work at Kelly Field was exceptionally able. He bore the brunt of the organization of the Second Training Brigade and made the camp a model of excellence.

He was called to Washington early in the year and was made Chief of the Operations Section and later assistant to the Director of Military Aeronautics. He was promoted to Colonel in August.

Colonel Brant has been known throughout the Air Service as the friend of the young officer. His patience and unfailing good humor have made for him a warm place in the hearts of thousands of officers who have served under him during the most trying times. He has been ordered to take command at Ellington Field.

Discharges of A. S. Officers

The following officers of the D. M. A. have been honorably discharged from the service of the Government: Second Lieut. Ralph C. Cook, Capt. Edward A. Robinson, Second Lieuts. Hartwell L. Hall and Robert L. Warfield, Capt. James M. Magee, First Lieuts. Edward A. Stinson and William J. R. Taylor, A. S. A.; Second Lieut. Ward Bowers Fletcher, A. S. M. A.; First Lieuts. Roy P. Crany and James A. Higgs, Jr., A. S. A.; First Lieut. Duncan Langdon, F. A.; Second Lieuts. Roger Tuckerman, Henry A. McAleenan, Roy L. Helstrom, Lawrence G. Gianniny and Wm. R. Gregory, A. S. A.; Capt. Edward R. Spiegel and Major E. Hubert Litchfield, A. S. A.; Second Lieut. Charles F. Mills, A. S. S. C.; Second Lieut. Pendleton Howard, A. S. A.; First Lieut. Michael A. Kiely, Second Lieut. Harry H. Singletary, First Lieut. Ralph Earle, Second Lieut. Edwin C. Smith, First Lieut. Theodore Sizer, Second Lieuts. Nathaniel P. Davis, William G. Boggs, Philip E. Chase and First Lieut. William Bernard, A. S. A.; Second Lieut. Edwin M. Eustis, A. S. S. C.; Second Lieut. Robert W. Pringle, A. S. M. A.; First Lieuts. George H. Hannun, Horace L. Stevenson and Second Lieut. Harry A. Irwin, A. S. A.; First Lieut. David G. Logg, A. S. M. A.; Second Lieut. Lewis H. Mahony, A. S. A.; Capts. Royal W. King and Ray C. Bridgman, A. S. A.; Second Lieuts. Hyland P. Stewart and George D. Riedel, A. S. A.; First Lieut. James M. Mason, Inf.; Second Lieut. Anton Pieron, A. S. S. C.

GOVERNMENT IS TO MAKE BIG DISPLAY

Arrangements Under Way for the Aeronautical Exposition

OFFICIALS IN CONFERENCE

Building in Addition to Madison Square Garden Will Be Used from March 1 to March 8

Arrangements for the Annual Aeronautical Exposition of the Manufacturers Aircraft Association are progressing so rapidly that, it appears now, the exhibits will extend into at least one building in addition to Madison Square Garden. On January 15 the Army and Navy sent representatives to New York City to confer on the proposition of Government co-operation. The representatives of the Navy were Commander G. C. Westervelt and Lieut.-Com. A. C. Read. Major H. M. Clark, Major H. J. Miller, Captain L. E. Rubel, Captain Roy Francis, Captain J. S. Maholl and Lieut. John Tuerk, represented the Division of Military Aeronautics.

.Captain Rubel and Commander Westervelt presented lists of possible exhibits. It is too early to publish these items as they are still the subject of discussion, but it may be said that both Secretary Daniels and Secretary Baker are personally very much interested in the aeronautical exposition and that they desire to inform the public as fully as possible on the development of aerial navigation.

Semi-Official Event

The Manufacturers Aircraft Association when it first planned the exposition believed that it would be possible for the members of the association to present a comprehensive idea of mechanical flight as applied to commerce in the future. The co-operation of the Government as now assured, means that the exposition will be semi-official in character.

Both army and navy in their suggested lists of exhibits have included photographic collections which will enable the visitor to visualize aerial warfare and its transition to peace time pursuits. For the first time it will be possble for the public to see how photographs have been taken of enemy lines and batteries. It is expected that the army will be able to have constructed in the Garden or in the armory, a model of a photographic hut such as those along the western front.

These huts were sometimes the most important points along the line of battle. Photographic planes returning from an expedition over enemy territory rushed their films to these places where the negatives were developed and prints hurried to the field commanders. From these prints maps were made of the German position and our line of attack planned accordingly.

Some of the Exhibits

While most of the exhibits will be given over to features of mechanical flight it is predicted that both the army and the navy will have examples of natural flight. That is, carrier pigeons, as used in the air service, will be on display. The Navy Department explains that some of their birds have averaged the delivery of four messages a day from seaplanes in distress and that consequently they have been the means of saving many lives.

The army collection includes airplanes ranging in size from the short-winged Penguin to the latest types of battleplanes. It is understood that the War Department only recently received a shipment of trophies from the American Expeditionary Forces and that this shipment includes a Fokker, an Albatros and a Taube and it is hoped that these examples of German construction will be on display.

SNAP SHOTS FROM ALOFT

Crediting the announcement made by a scientific magazine that Great Britain and Canada have planned a post-war air program which calls for $100,000,000 and $50,000,000 respectively per annum for seven years, it is not uninteresting to read the views of *Aeronautics*, an English aeronautical weekly of high standing, on the British aircraft industry:

> It (British aircraft industry) is a world of strenuous competition that it is about to enter. Among enemies not a few, two stand out preeminent, and their names are Government and Foreign Industry.
>
> Upon the latter we need bestow but little space. He is an enemy self-declared and a foe by nature, though not the less redoubtable for that. His strength is immense and is guided by a purposeful and agile brain. In all probability he will have the powerful backing which the resources of his various Governments can give him. He has already entered the field, for do we not read that Germany, after having been shorn of 1700 of its best machines, has already organized passenger services within the confines of the Central Empires? Again, the vast output of the American industry during this last year's working will without a doubt be converted at the earliest possible moment to commercial use. However friendly may be our relations in other respects, it is clear that in a trade-war America will be our most formidable antagonist. It is true that at present American aeroplanes are built to British designs—or at all events the majority and the best of them—but it would be the height of folly to assume that aircraft design will always remain a close preserve for British, French or Italian talent.
>
> Until America entered the war she had steadily refused to regard aerial navigation as a serious commercial possibility; despite all flamboyant reports to the contrary, she strongly held the view that there was no money in it. As a consequence, before the war the industry languished; since its prospects were uncertain, it failed to attract the really good men and first-class engineers. But with the war conditions have radically altered. Whatever the value Wall Street may attach to the financial future of aerial transport, one fact is certain; the American aircraft industry is in being and will have to find an outlet for its energies. And these remarks apply not only to America; they are equally true of every great country which has been compelled by the war to create a great aircraft industry. But trade competition, as already stated, was an obvious peril, long foreseen. It is one that has to be faced by our industry, who alone can overcome it.

Major Frank D. Lackland

Major Frank D. Lackland enlisted in the National Guard, District of Columbia, in March, 1903; served through all grades to Captain, 1910. Completed all subjects in Garrison School for Officers, Fort Meyer, Va., 1907-08-09. Took examination for Regular Army November, 1910, at Fort Leavenworth, Kansas. Commissioned Second Lieutenant Infantry and assigned to 11th U. S. Infantry in the field, 1911; Fort D. A. Russell, Wyoming, 1911-12-13; Texas-Mexican border trouble, 1913-14. Assigned to 13th U. S. Infantry, August, 1914; Philippine Islands, 1914-15-16-17. Assigned to 31st U. S. Infantry on formation of that regiment in 1916. On return to United States, July, 1917, assigned to 22nd U. S. Infantry. Commissioned Major, Signal Corps, and assigned to Aviation Section, October 26, 1917. Kelly Field, November, 1917, to May, 1918. Selfridge Field since April, 1918. Executive Officer, School Director and Commanding Officer.

BAKER'S PLANS FOR THE U. S. AIR SERVICE

Includes 1,923 Officers and 21,853 Enlisted Men

AN OFFICIAL STATEMENT

Measure Is the Result of the Study Made by the General Staff for an Army of 500,000 Men

The suggested bill presented by Secretary Baker to Congress for the American Army on Jan. 16 included 1,923 officers and 21,853 men for the Air Service, specified as follows:

1	Major General	515	Master Signal Electricians
1	Brig. General	2,282	Sergts. 1st Cl.
22	Colonels	1,737	Sergeants
45	Lieut. Cols.	134	Mess Sergts.
126	Majors	2,485	Corporals
438	Captains	134	Buglers 1st Cl.
696	First Lieuts.	2,738	Wagoners
594	Second Lieuts.	584	Cooks
		4,366	Pvts. 1st Cl.
		134	Buglers
		6,744	Privates
1,923	Officers	21,853	Enlisted Men

The Secretary of War reported to the press Jan. 16, 1919, as follows:

The bill presented to the House Committee on Military Affairs today is the result of the study made by the General Staff for the creation of an army of five hundred thousand men divided into such organizations as have been shown by our experience in this war to be appropriate. Under the law as it now is, the present army is in process of demobilization. Some provision is therefore necessary to authorize a regular army for the transition period and until the situation growing out of this war is sufficiently clarified to enable the United States to determine the permanent military policy which will have a proper relation to its needs and obligations. No effort is made in this bill to treat the question of universal training or service, but merely to produce an army deemed adequate to meet obligations and needs which can now be foreseen.

In addition to this, the bill provides for the legalization of the present relations and organization in the General Staff in order to preserve what we have built up as the result of experience and growth. The present organization of the War Department is of course a wide departure from the organization which existed before we went into the war, and it is wiser to keep what we have than to go back to the beginning and start over at some future time. It is a part of the purpose of this bill to enable the Government to officer the newly constituted Regular Army by retaining in the service officers of proved ability who have come in either from the National Guard or from civil life during the war and who desire to make the army a permanent career. The principle of promotion by selection rather than by strict seniority is introduced above the grade of captain. During the war of course promotion has been by selection and our experience shows it to be both a wise and a just method of promotion.

It is not believed that action on the bill will be taken by the present Congress.

An Appreciation of Balloonists

A few days before operations at the fronts were stopped by the signing of the armistice, two orders were issued by commanding officers of the balloon forces, A. E. F., expressive of the appreciation of their services on different occasions. One was signed by J. H. Greely, Chief of Staff, First Division, France, was addressed to the Commanding Officer of the Second Balloon Co., and read as follows:

"The Commanding General, 1st Division, directs me to express to you his appreciation and the appreciation of the division for the services rendered by your organization during the operations participated in by this division between the Meuse and the Argonne from Sept. 29 to Oct. 11, inclusive. The energy and alertness of your organization, which enabled the frequent identification of artillery targets, were of great value to the division."

The other was issued on the order of Major Jonett, commanding the Balloon Group, Fifth Army Corps, by First Lieut. Carleton C. Jones, Adjutant, to the 6th, 7th, 8th, 12th and 43rd Balloon Companies; C. A. B., First Army, and C. A. S. (Balloon Section). It reads:

"1. The entire Balloon Service honors the manoeuvering squad of the 12th Balloon Company. The devotion to duty shown by the men who composed this squad on Oct. 1, 1918, was such as to set a glowing example to all other balloon companies in the American Expeditionary Forces.

"2. Despite the fact that shells were falling on all sides of the balloon, two so close as to tear holes in the fabric, no man left the ropes nor faltered, well knowing that death was liable to come to them at any moment. The safety of the balloon was their first thought; their personal safety second. They have shown the spirit and loyalty which is expected of true soldiers.

"3. This order is to be read to all balloon organizations in the Balloon Group, Fifth Army Corps, at the first formation after its receipt."

London—Paris Air Line Opens

A regular aerial passenger service between London and Paris for the benefit of British members of the Peace Conference was opened Jan. 20. Several airplanes have been fitted up for this purpose. They have a comfortable cabin for two passengers, including cushioned seats and a table, the whole inclosed with glass.

The airplanes will make the trip in two hours.

THE ANNUAL

Aeronautical Exposition

OF THE

Manufacturers Aircraft Association
INCORPORATED

WILL BE HELD

MARCH 1st to MARCH 8th

IN

Madison Square Garden, and the
69th Regiment Armory, New York City

AMERICA THE PIONEER IN AERONAUTICS
IS CHALLENGED BY THE WORLD

This Exposition

Will illustrate
What American Industry is Doing to
Keep Our Flag in the Skies

* * *

For further information address:

SHOW COMMITTEE
MANUFACTURERS AIRCRAFT ASSOCIATION
501 Fifth Avenue :: :: NEW YORK CITY

Brazil to Have Air Mail and Express

By decree of Oct. 23, 1918, the President of Brazil granted to João Teixeira Soares and Antonio Rossi a concession to establish, either under their own management or under that of a company which they may organize, an airplane service between the principal cities of Brazil. The stations to be established will include the capitals of all the States, the concessionaires being empowered to extend the service whenever the demand seems to warrant such extension. The service between the capitals must be in operation within two years, the Government reserving the right to extend the time for two years more.

The concessionaires' activities will comprise the carrying of small packages and mail; but, with the further development of aviation, passenger transportation will be permitted upon the approval of the Government. The number of trips required and the tariffs will be fixed by the Federal Government, but no mail matter may be transported that is not first properly stamped and postmarked.

The concessionaires must admit Government student aviators to their machines and hangars. In time of war the Government may take over the service, paying a rental based upon the profits of the three-month period preceeding, but being fully responsible for the restitution of all materials taken over.

F-5-L—Flying Boat—Front View in Flight, Close to Water
Equipped with 2 Liberty-12; 107 ft. span; 50 ft. long; 102 m. p. h. maximum speed; weight, fully loaded, 14,000 lb.; crew, 4-5 men; radio apparatus

Britain Plans Air Service to India

Major-Gen. Salmond, commanding the Royal Air Forces in the Middle East, accompanied by Capt. Ross Smith, has arrived at Karchi, on the Baluchistan border, and is in conference with the Government of India regarding the establishment of an aerial service to India.

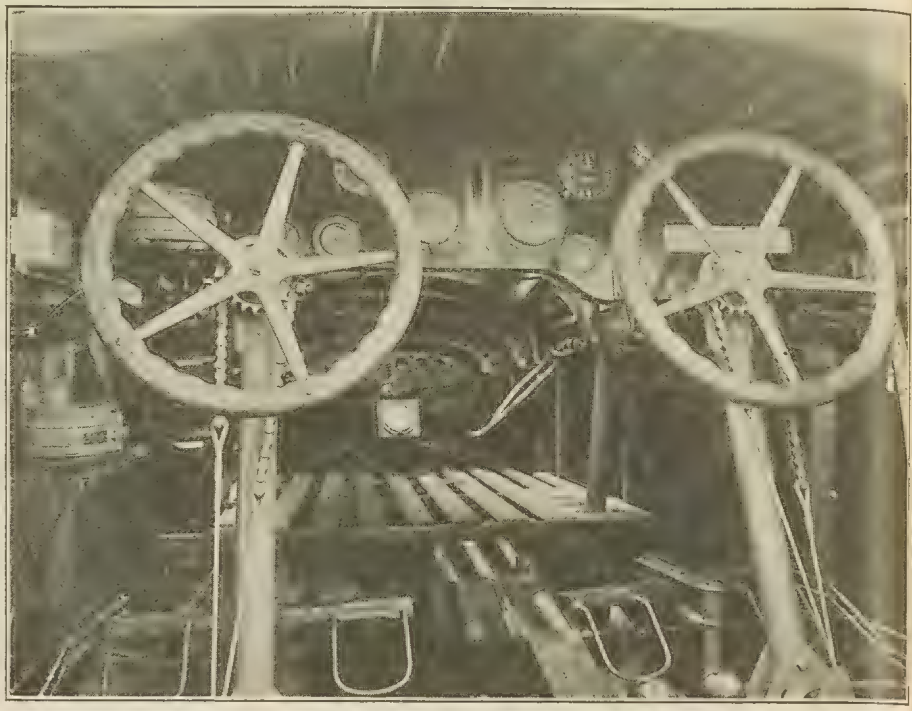
These aviators have just completed a flight from Cairo to Karachi, 2,548 miles, in thirty-six hours actual flying time. Their route was by way of Damascus, Bagdad, Bushire, Bandar Abbas, Sarbaz and Karachi.

The machine used for the purpose had previously been flown from England to Egypt and took active part in final operations against the Turks in Palestine.

General Salmond will continue his journey by air to Delhi.

C-1 Reaches Key West

The navy dirigible C-1 arrived at Key West, Fla., at 2.45 o'clock January 15, completing its flight from Rockaway Park, N. Y.



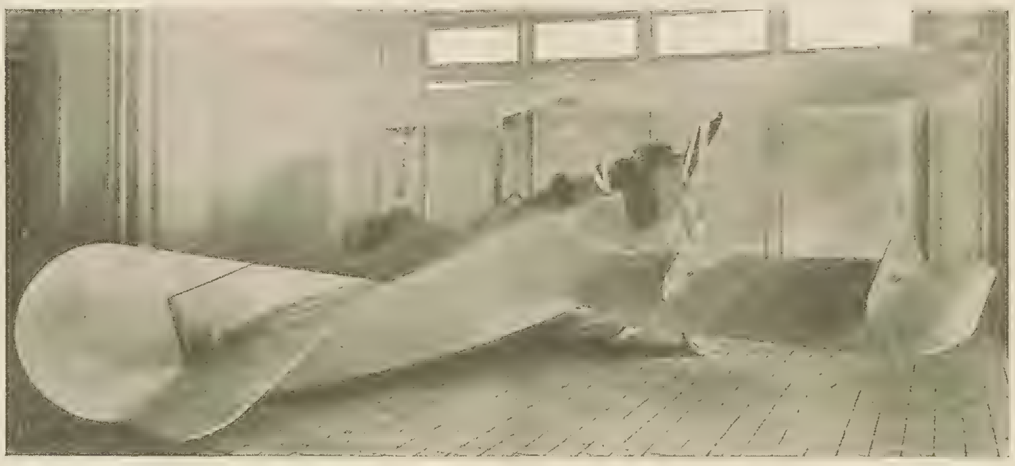
F-5-L—Instrument Board—New Foot Control—Extra Compass—Boat 3567

HERE IT IS—IT IS THE ACE—THE PRACTICAL AEROPLANE

Ready For Immediate Delivery

Designed for civilian use—for the man who rides his ranch, and the man who loves the air—regardless of the business that calls him

Low in Cost of Upkeep



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PLANS EARLY CROSSING OF THE ATLANTIC

Caproni Ship to Fly from Spain to Atlantic City

TO STOP AT THE AZORES

Italian Interests Plan the Establishment of a Large Aviation Factory in the United States

The crossing of the Atlantic Ocean by aeroplane may be accomplished in the near future with a great new Caproni biplane, with the final stop in Atlantic City, the start to be made from the coast of Spain, with one stop at the Azores Islands.

Such is the plan outlined in a letter received today by Lieut. Joseph Schwartz, Quartermaster Corps, U. S. A., from Frederic Semprini, who was chief instructor of the American pilots during the war at Milan, Italy. The communication was addressed to Lieutenant Schwartz's brother, Samuel Schwartz, who is now connected with the Purchasing Department of the American Expeditionary Forces in Europe, who discussed the undertaking while on a visit at Milan.

As chief pilot representing the Caproni Society in Italy, Semprini gained experience in the use of air machines which he now proposes to use in a flight across the Atlantic, and tells of the creation of the world's biggest triplane for the transport of passengers, which has an enormous engine.

The plane has just been tested. It develops great speed and carries thirty-five to forty passengers. Another still larger plane is under construction which, it is said, will have a passenger-carrying limit of 100. According to the announcement, the attempt to cross the Atlantic will be made early this year, and unlike a number of flights similarly planned by American pilots, the flight will be made from east to west.

Also plans are said to be under way by members of Italian aviation interests for the development of a large aviation station and factory in the United States.

Positions Sought for Army Officers

The United States Employment Service has issued an appeal to employers in need of technical and other highly-trained men to take on qualified men from the commissioned and enlisted ranks of the Army who are now leaving the camps.

Hundreds of officers, many of the higher ranks, are asking the camp representatives and Federal directors of the Federal Employment Service for the States to assist them to obtaining new employment. There are also large numbers of enlisted men qualified for professional and technical positions who are leaving the Army without having positions in sight.

Among the men of this high type applying at the Federal Employment Service are engineers and other technical men, executives, chemists, statisticians, purchasing agents, employment managers, cost accountants, etc.

All employers wishing to get in touch with these men should communicate with the Professional Section, United States Employment Service, Department of Labor, Washington, D. C.

Paris-Alsace Air Mail

In order to remedy the slowness of correspondence with Alsace-Lorraine the French Aeronautic Department has organized an air mail service between Paris and the principal towns of Alsace-Lorraine.

DEVELOPMENT OF THE RADIO TELEPHONE

Due to the Combined Efforts of a Group of Men

CHRONOLOGICAL HISTORY

Hardly an Invention, But the Adaptation of Certain Established Principles to a New Field

A chronological history of the development of the radio-telephone, whereby the flight of airplanes may be controlled by a voice from the ground, has been prepared by the office of the Director of Military Aeronautics. It traces its development from the conception of the idea and the first experiments over eight years ago up to the present time, when several recent practical and successful demonstrations of the instrument have been given.

Among them was a demonstration, in which the President a few weeks ago directed from a portico of the White House the evolutions of six airplanes. Another demonstration took place at the headquarters of the Division of Military Aeronautics, Washington, on Dec. 10, at which Major-General Kenly, Colonel Culver, Mayor Maurice Connolly and other officers of the Air Service, and also Senator Francis E. Warren, of the Senate Committee on Military Affairs, were present. The instrument used in the latter occasion in understood to be a radiotelephone even more improved than the one previously used.

The official history, which shows that credit for the development of the radiotelephone is due not to any single individual, but to the combined efforts of a group of men, is as follows:

"Communication established by radio telegraph from an airplane in flight to the ground, by H. M. Horton (now Captain, Air Service), and Lieut. C. C. Culver (now Colonel, Air Service), in August, 1910. Captain Horton built the transmitting set and Colonel Culver the receiving set. This communication was accomplished at an aeronautical meet at Sheepshead Bay.

"In October, 1910, the idea of giving command by voice to a fleet in the air was first conceived by Col. Samuel Reber and Colonel Culver while on duty at the International Aviators Tournament at Belmont Park.

"In August, 1915, Col. Culver was detailed to the Aviation School, San Diego, Cal., for the purpose of working on the general program of radio for airplanes, with the development of apparatus to permit of the giving of vocal commands by the commander of an air fleet as the ultimate goal. Development work on this continued through 1915.

"In 1916, development continued throughout the year. Telegraph apparatus was designed and built, whereby communication was established from airplane to ground over distances up to 140 miles. Means were devised by which reception of radio messages could be accomplished in the airplane in the noise of the motor. On Sept. 2, 1916, a message was transmitted from one airplane to another in flight. About this time development of a radio telephone set for airplanes was undertaken.

"In 1917, development continued at San Diego, Cal., until Colonel Culver was ordered to Washington, in March. In February, 1917, a trial of the radio telephone set resulted in transmission of the human voice from airplane to ground. Colonel Culver continued on development work and study of the requirements that the apparatus should meet, in the latter being assisted by foreign officers on duty in this country.

"May 22, 1917, Maj.-Gen. George O. Squier, Chief Signal Officer, brought into

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Western Electric Company, and Col. C. C. Culver, U. S. A. At this conference the problems were discussed of air radio telephone communication, and before it was laid propositions for development of apparatus.

"In order to bring these problems in concrete form before the best radio telephone engineers in the country, a memorandum was given Dr. Jewett on this date (May 22) covering the general requirements of an air radio telephone set, and requesting that he submit this problem to his engineers.

"Development work on both radio telegraph and telephone was continued. In July, 1917, the Radio Development Section of the Signal Corps was organized, Lieutenant-Colonel Slaughter being placed in charge. Colonel Culver continued his work with this section on radio pertaining to the Air Service.

"On Aug. 22, 1917, while on a visit to Langley Field, Secretary of War Baker, and Chief of Staff, Gen. Hugh L. Scott, were given a demonstration of telephonic communication from an airplane in flight to the ground, by Colonel Culver.

"In October, 1917, Colonel Culver went abroad, taking with him sets of the various types of apparatus, in order to demonstrate to the officers of the United States and allied forces the entire practicability of the idea.

"Since the return of Colonel Culver in 1918, under the immediate supervision and with the whole-hearted support of Major-General Kenly, there has been continuous progress made in the working out of tactical problems through the use of the wireless telephone and the development of its application to various Air Service activities."

It is expressly pointed out that this use of the wireless telephone can hardly be called an invention, but rather an adaptation of certain principles to a new field, and that the efforts of so many men entered into its development and application that no one person should be given entire credit for it. Also that the extent to which this apparatus was used on the front in France is something regarding which there is no definite information in this country. Quantity shipments of this apparatus began in August, 1918.

Direct Aircraft by Radiophone

A demonstration in directing aircraft by radio telephone was given Jan. 17 from the roof of the Equitable Building, New York City. It was arranged by the Navy as a feature of the opening of the $2,000,000,000 War Savings Stamp campaign. The radio communication was between a group of men on the roof of the Equitable Building and Navy Dirigible A242, escorted by a formation of airplanes from the Rockaway Station. The airship, commanded by Ensign John Benridge, cruised over the city for about half an hour, following the directions given by wireless telephone. The weather was thick and the machines appeared at an altitude of about 1,000 feet.

James S. Alexander, President of the National Bank of Commerce, was the first of the civilians present to communicate with the airship. He got into touch with Ensign Bark, the radio man on the dirigible, after the Navy operators had made the necessary adjustments. At that time the weather was so thick that the aircraft could not be seen. Mr. Alexander inquired when they would come into sight, and almost while he was talking the formation came through the mist.

"You will circle about the Woolworth Building," directed Mr. Alexander. The blimp almost immediately changed her course, and headed to execute the order. This accomplished it carried out other spoken orders from the group on the housetop. Mr. Alexander said Ensign Bark's brief replies had been quite distinct. He had requested the Ensign to speak slowly and distinctly, and when this was done he heard every word clearly.

Others who conversed with the operator on the airship as it circled over the lower part of the city were George T. Wilson, Major Gen. Thomas H. Barry, Major Gen. Davis C. Shanks, Guy Emerson, Vernon Munroe, and A. M. Anderson.

Had a Two-Way Radiophone Talk

A conversation was held in the morning of Jan. 16 between Major Gen. William L. Kenly, Director of Military Aeronautics, seated before the ordinary desk telephone in his office and Lieutenant Lucas of the Air Service, piloting a radio-equipped airplane. This communication involved the use of telephone lines of the Chesapeake & Potomac system, was made at the local radio station at Bolling Field, where aparatus was connected in such manner that speech originating in either system would be automatically transmitted over the other. Besides General Kenly, Colonel F. R. Kenney and Colonel C. C. Culver talked with Lieutenant Lucas.

The airplane radio telephone has been in use for more than a year, and air fleets are being commanded by the voice of their commanders at several flying fields in the country. In aviation, communications have been made between the pilot in the air and land lines on the field. The conversation on Jan. 16, however, was the first official demonstration of a two-way conversation direct between a person using a line telephone and an aviator in flight.

The great degree of efficiency reached makes it possible for a telephonic conversation to be carried on between New York and San Francisco. By substituting a transcontinental line for General Kenly's branch line, the element of distance is practically eliminated and conversation is made possible between an airplane in flight and any point reached by a good telephone circuit. Thus it becomes a mere matter of detail to have an aviator in the air over Washington in conversation with a man in his office in San Francisco, or with an airplane in flight over San Francisco.

Perkin Medal for Dr. F. G. Cottrell

Dr. Frederick G. Cottrell, Chief Metallurgist of the United States Bureau of Mines, who received the Perkin medal for distinguished services in applied chemistry, at the clubhouse of the American Chemical Society, 35 East Forty-first Street, Jan. 17, is the discoverer of a new process of extracting "helium" from the air. Helium is a recently discovered gas which is meeting the demand of the Army Air Service for a non-inflammable filler for balloon and dirigible bags. It is said to be slightly inferior for ascension purposes to the hydrogen gas now used, but its non-inflammability makes it invaluable to the service.

The process for obtaining helium from a natural gas has been developed by the Bureau of Mines, and will have its production test on a large scale in a new plant at Petrolia, Tex.

Dr. Cottrell pointed out in his speech of acceptance that, should the new process fulfill anticipations, it would place vast quantities of oxygen at the disposal of manufacturers and producers of copper, iron and steel. He said it was hoped the new process for the liquefaction and distillation of air will result in obtaining oxygen and hydrogen for industrial purposes at a cost which would extend their use to many trades and industries which now are unable to afford them.

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Production of Guns and Ammunition

According to a statement issued by the War Department, quoting the Ordnance Department, Inter-allied Bureau of Statistics, the total average monthly rate of production of machine guns and machine rifles by Great Britain, France and the United States during July, August and September was 50,343. Of this number, the first-named country produced 10,947; the second, 12,196, and the last, 27,270, or 3197 more than the other two countries together.

The total production from April 6, 1917, to Nov. 11, the date of the armistice, is given as 592,304, of which Great Britain produced 181,404; France, 229,238, and the United States, 181,662.

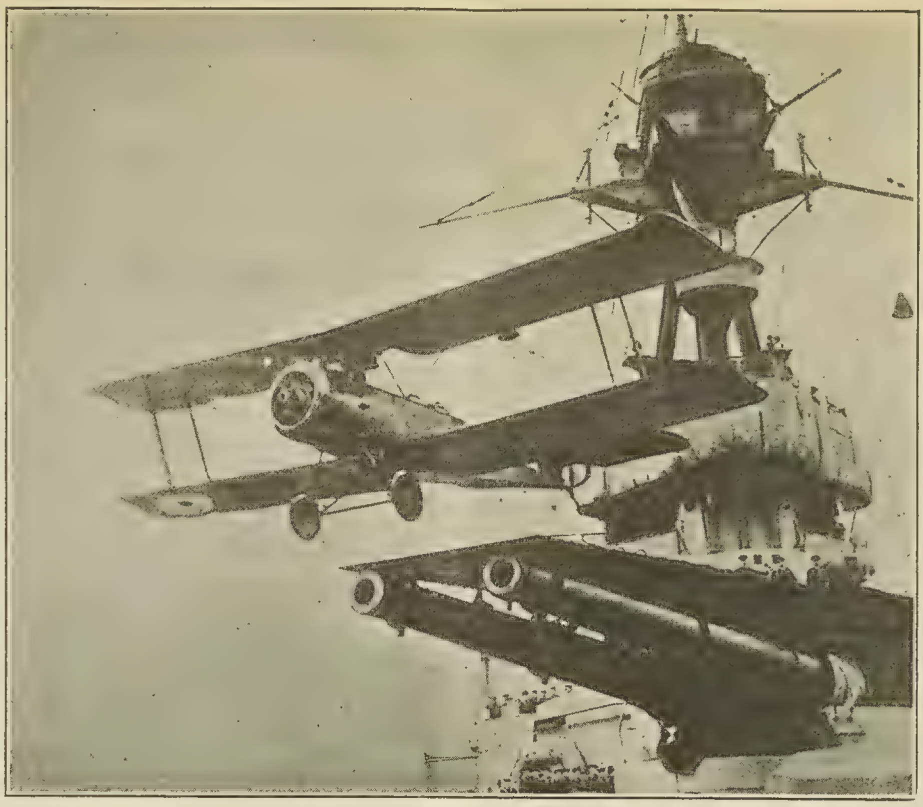
In the three months named, the three countries produced machine gun and rifle ammunition at the monthly rate of 677,508,000 rounds, of which 259,769,000 are credited to Great Britain; 139,845,000 to France, and 277,894,000 to the United States.

From April 6, 1917, to Nov. 11, the total production was 9,348,950,000 rounds, distributed as follows: Great Britain, 3,486,127,000; France, 2,983,675,000, and the United States, 2,879,148,000.

United States ammunition production figures include airplane, incendiary, armor-piercing and tracer types.

Crossed the Andes in an Airplane

Lieut. Dagoberto Godoy of the Chilean army Dec. 13 crossed the Andes Mountains at their highest point in a Bristol airplane, donated by the British Government. The aviator left Santiago, Chile, and crossed the Tupungato range at an altitude of 19,700 ft., landing at Mendoza, Argentina.



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Scout Plane "Taking Off" from a Dreadnought

Planning Monument to U. S. Aviators

Officers of the Division of Military Aeronautics will co-operate with the Interior Department in erecting a memorial to aviators killed in the war.

The following named officers are constituted a Board, to meet at the call of the President, for the purpose of assisting and co-operating with the Secretary of the Interior and George B. Dorr in the matter of the erection of a monument in the Sieur de Monts National Park to the aviators who have died during the war: Major Gen. W. L. Kenly, A. S. A., and Cols. F. R. Kenney, A. S. A.; Arthur Woods, A. S. A., and Grover O'Neill, A. S. A.

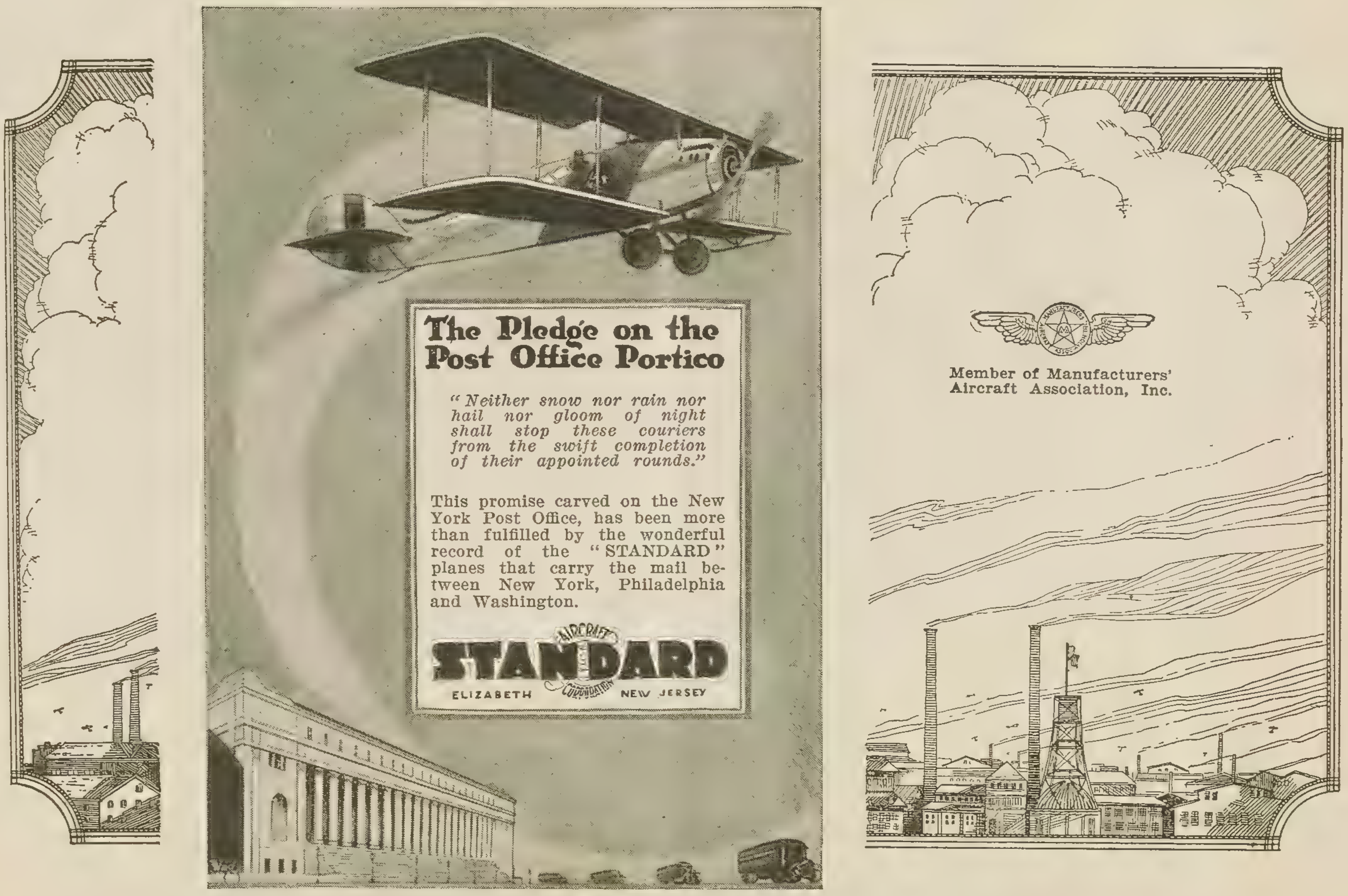
Air Service Clubs Association News

Although officers in the flying service of the Army, Navy and Marine Corps have always been eligible as members of the A. S. C. A., recent developments indicate that a large number of Naval and Marine Corps flying officers will shortly join the Association. In order that the Association name shall be more indicative of the nature of the organization it has been recommended that it be changed to the Army and Navy Air Service Association.

At a special meeting of the Board of Control of the Association, held on January 15, at which representatives of Naval Aviation were present, it was voted to call a special meeting of the Association for February 15, at which time two amendments to the constitution will be submitted with the approval of the Board of Control. These amendments will comprise the recommended change in name, and authority for the Board of Control to appoint temporary officers or members of the Board, to take the place of officers or members who have resigned.

The naval officers present were Commander Towers and Lieut. Commander Billinger, U. S. N., and Major Cunningham, U. S. M. C., who composed a committee selected at a meeting of a number of Naval and Marine Corps aviation officers. Commander Towers reported that it was the sense of the meeting that, individually, the officers believed that the Naval and Marine flying officers should affiliate with the Association.

At the February meeting it is intended that the details of the affiliation be carried out and that everything be done to make the Association a representative national flying institution.



The Pledge on the Post Office Portico

"Neither snow nor rain nor hail nor gloom of night shall stop these couriers from the swift completion of their appointed rounds."

This promise carved on the New York Post Office, has been more than fulfilled by the wonderful record of the "STANDARD" planes that carry the mail between New York, Philadelphia and Washington.

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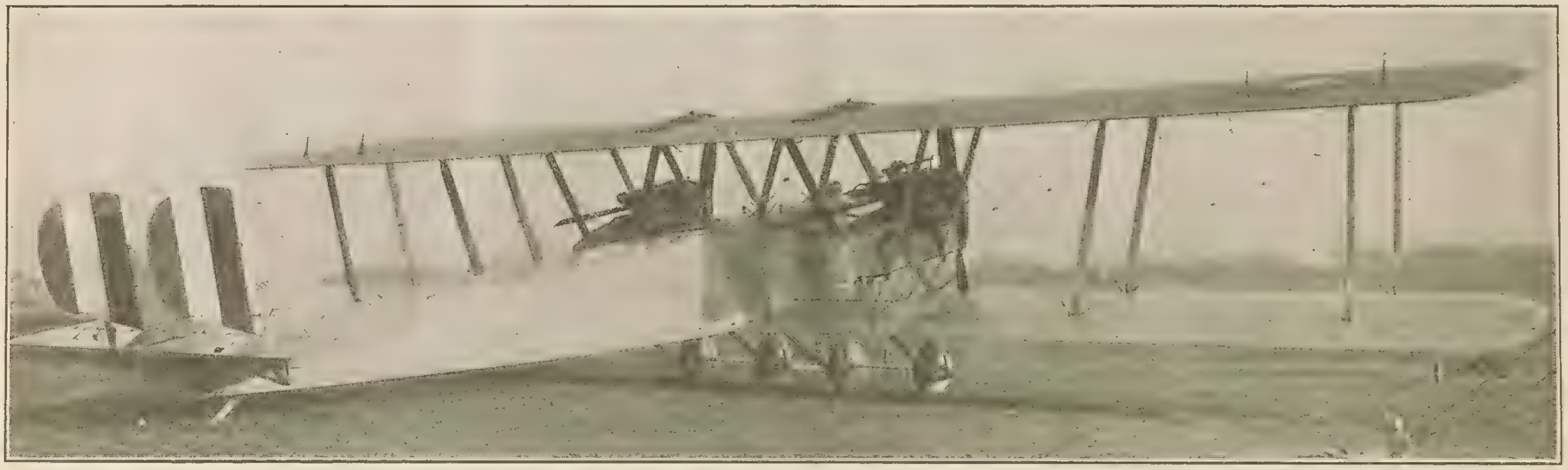
Sixty-Three American Aces in Official List from France

In a cable to the Adjutant General on Jan. 8, General Harbord credits the Air Service, A. E. F., with sixty-three aces. General Harbord stated that there may be a few more names to be added, and that the figures are subject to slight revision.

In the list, which follows, the number of enemy planes brought down by each ace runs from 5 to 26. As the list stands it shows that the sixty-three American aces accounted for 444 enemy fliers. Eight of the sixty-three are listed as dead and one as missing in action:

Name	No. of Victories	Address
Capt. Edward V. Rickenbacker	26	1334 East Livingston Avenue, Columbus, Ohio
First Lieut. Frank Luke, Jr., (Deceased)	18	2200 West Monroe St., Phoenix, Ariz.
Major Victor R. Lufbery (Deceased)	17	Dieppe, France
First Lieut. David E. Putnam (Deceased)	12	47 Englewood Avenue, Brookline, Mass.
Capt. Reed G. Landis	12	Hotel Winderemere, Chicago, Ill.
First Lieut. Fields Kinley	10	Gravette, Ark.
First Lieut. George A. Vaughn, Jr.	10	441 Washington Avenue, Brooklyn, N. Y.
First Lieut. Jacques M. Swaab	10	16th and Diamond Streets, Philadelphia, Pa..
First Lieut. Thomas G. Cassady	9	(No home address)
First Lieut. Chester E. Wright	9	41 Dana Hall, Cambridge, Mass.
First Lieut. William P. Erwin	9	814 Fine Arts Building, Chicago, Ill.
Capt. Elliott W. Springs	9	Lancaster, Pa.
First Lieut. Henry R. Clay, Jr.	8	1703 Summit Avenue, Ft. Worth, Tex.
Major James A. Meissner	8	45 Lenox Road, Brooklyn, N. Y.
Capt. Hamilton Coolidge (Deceased)	8	10 West Place, Boston, Mass.
Capt. G. DeFreest Larner	8	Highland Apartments, Washington, D. C.
First Lieut. Paul Frank Baer	8	1304 Maud Street, Ft. Wayne, Ind.
First Lieut. Frank O. D. Hunter	8	218 Gaston Street, Savannah, Ga.
First Lieut. Wilbert Wallace White (Deceased)	8	541 Lexington Avenue, New York City.
Second Lieut. Clinton Jones	8	2617 Buchanan Street, San Francisco, Cal.
Capt. Reid M. Chambers	7	276 Monroe Street, Memphis, Tenn.
First Lieut. Harvey Cook	7	Toledo, Ohio.
First Lieut. Lansing C. Holden	7	103 Park Avenue, New York City.
First Lieut. Karl Harold J. Schoen (Deceased)	7	5001 College Avenue, Indianapolis, Ind.
First Lieut. Wendel A. Robertson	7	Ft. Smith, Ark.
First Lieut. Leslie J. Rummell	7	798 South 11th Street, Newark, N. J.
First Lieut. Lloyd A. Hamilton (Deceased)	7	Burlington, Vt., or Pittsfield, Mass.
First Lieut. Jesse O. Creech	6	6614 Harlan Place, Takoma Park D. C.
Second Lieut. Howard Burdick	6	175 Remsen Street, Brooklyn, N. Y.
First Lieut. Clayton L. Bissel	6	114 Janeway Street, Kane, Pa.
Major Harold E. Hartney	6	Care R. Hartney, Esq., Saskatoon, Saskatchewan, Canada.
Capt. Douglas Campbell	6	Lick Observatory, Mt. Hamilton, Cal.
Capt. Jerry Cox Vasconcelles	6	1,925 East 11th Avenue, Denver, Col.
Capt. Edgar Gardner Tobin	6	San Antonio, Tex.
First Lieut. E. P. Curtis	6	8 North Goodman Street, Rochester, N. Y.
First Lieut. Sumner Sewell	6	(No address).
First Lieut. Ralph A. O'Neill	6	218 Sonoita Street, Nogales, Ariz.
First Lieut. Donald Hudson	6	4,119 Walnut Street, Kansas City, Mo.
First Lieut. Murray K. Guthrie	6	Mobile, Ala.
First Lieut. William H. Stovall	6	Stovall, Miss.
First Lieut. James D. Beane (Missing in action)	6	Concord, Mass.
First Lieut. Arthur R. Brooks	6	New Kendall Hotel, Framingham, Mass.
First Lieut. Robert O. Lindsay	6	Madison, N. C.
First Lieut. Martinus Stenseth	6	Twin Valley, Minn.
Second Lieut. Frank K. Hays	6	2,000 West 101st Place, Chicago, Ill.
First Lieut. Howard C. Klotts	5	(No address).
Lieut.-Col. William Thaw	5	Care Equitable Trust Co., 123 Rue de la Paix, Paris, France; Pittsburgh, Pa.
Major David McK. Peterson	5	Honesdale, Pa.
Capt. H. R. Buckley	5	Agawan, Mass.
Major Charles J. Biddle	5	505 Chestnut Street, Philadelphia, Pa.
First Lieut. James Knowles	5	Cambridge, Mass.
First Lieut. James A. Healey	5	361 Union Street, Jersey City, N. J.
First Lieut. Innes Potter	5	(No address).
First Lieut. Francis M. Symonds	5	20 West 8th Street, New York City.
First Lieut. Joseph F. Wehner (Deceased)	5	124 East 28th Street, New York City.
First Lieut. John J. Seerley	5	5747 University Avenue, Chicago, Ill.
First Lieut. Edward M. Haight	5	Astoria, N. Y.

(*Continued on page* 11)



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American Aviators with the British

Twenty-five enemy airplanes were brought down by American aviators brigaded with the British between Sept. 23 and Oct. 20, inclusive, and five American aviators were decorated with the British Distinguished Flying Cross, according to the latest Royal Flying Corps communiqués received by the Division of Military Aeronautics.

Second Lieut. H. C. Knotts, 17th American Squadron, whose home is in Carlinville, Ill., received the following special mention in the communiqué on Sept. 29:

"Second Lieut. H. C. Knotts, 17th American Squadron, while on the offensive patrol, saw a lower flight attacked by eight enemy airplanes and diving on one of them shot it down. On turning back to regain his formation another enemy airplane attacked him from behind, but he succeeded in maneuvering on its tail, shooting it down in flames."

The Distinguished Flying Cross was awarded to Lieuts. H. R. Clay, Fort Worth, Tex.; R. G. Landis (no address); E. W. Springs, Lancaster, Pa.; F. E. Luff, Cleveland, Ohio, and J. O. Donaldson, Washington, D. C.

Enemy planes were brought down by Lieuts. E. W. Springs, Lancaster, Pa.; F. E. Kinvley, Cranette, Ark.; W. B. Knotts (no address); E. H. Zistell (no address); T. Whyly (no address); W. T. Clements, Gloucester, Va.; H. Burdick; Brooklyn, N. Y.; A. O. Ralston, Weeping Water, Neb.; J. O. Creech, Washington, D. C.; H. R. Clay, Fort Worth, Tex.; C. I. McLean, New York City; L. W. Rabe, Payson, Ill.; G. A. Vaughn, Findlay, Ohio; J. O. Donaldson, Washington, D. C.; C. Bissell (no address), and L. M. Callahan (no address).

During this period one enemy balloon was shot down in flames by Second Lieut. J. B. Garver, whose home is in Strassburg, Ohio.

The record of the American aviators who have been brigaded with the British has been a creditable one. The Royal Flying Corps communiqués show that from Sept. 9 to Oct. 20, with one week missing, thirty-six enemy airplanes and two hostile balloons were brought to earth by Americans. Eleven Distinguished Flying Crosses were awarded to American aviators by the British Government during this period.

Standard Opens a New Club House

Early last month the Standard Aircraft Corp. of Elizabeth, N. J., tendered a dinner to the Government employes, uniformed and civilian, Army and Navy, male and female, stationed at the plant. About 250 covers were laid. The dinner was unique in one phase—only Mr. Mingle saying a few words in greeting and congratulations. Other speechmaking was tabooed—but the spontaneous singing was certainly enjoyable. J. M. Meirick thus tells of the event:

AT LAST

Write this down.
Let History record the event.

On Monday 8:02 P. M. with a fanfare of trumpets the NEW CLUB HOUSE was formally inducted into service. Every employe was invited as the guest of the company and the large hall was filled to capacity.

The programme of the opening event follows: Time 8 to 10 P. M.

Orchestra....a) March b) Overture
Motion Pictures,
"Events in Standard Land"
Madame de Sylva,
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"The Star Spangled Banner" and other selections
Mr. Al. Baker, Ventriloquist,
"Fun with Danny"
Miss Margaret Calvert,
The Dancing Violinist
Congressman Ford..........Monologues
Friedberg & DeSylvia,
The Singing Gypsies
Motion Pictures,
"Current Events Standard Aircraft"
Dancing..............until 11:30 P. M.

Change in Army A. S. Regulations

Following is an advance copy of a prepared but unissued order by the War Department changing paragraph 1585, Army Regulations, 1918, to read:

"Men may be enlisted for the Air Service in the class or grade for which they are competent and in which there is a vacancy. *Enlisted men* may be promoted or appointed to *non-commissioned* grades by any field officer of the Air Service under whose direct command they may be serving, *except that when an aero squadron or balloon company is stationed where there is no Air Service officer of field rank, promotions and appointments may be made by the commanding officer of the aero squadron or balloon company.*

"Master electricians will be appointed only on the approval of the Chief of Air Service or that of the senior officer of the Air Service present with an army or army corps, except that when the activities of the Air Service are divided under paragraph 1574, they will be appointed by the chiefs of their respective divisions.

"Non-commissioned officers, chauffeurs, first class, chauffeurs, cooks, privates, first class, may be re-enlisted for the Air Service in their respective grades and their warrants and appointments continued in force if re-enlistment be made on the day following that of discharge.

"If the officer under whom the soldier is serving does not deem the continuance in force of the warrant or appointment to be for the best interests of the service, he will report in detail to the officer authorized to make appointments not less than three months prior to the expiration of the soldier's term of service, in order that a decision may be made before date of discharge and the soldier notified thereof.

"Married men may be re-enlisted in the Air Service upon approval by a field officer of the Air Service."

Royal Air Force Losses

Casualties in the royal air forces from April, when the air forces were amalgamated, to November 10 were: Killed, 2,680; wounded, missing and prisoners, 4,909, according to an official statement by the air ministry. The total air casualties throughout the war will be announced later.

Sixty-Three American Aces in Official List from France

(*Continued from page* 10)

First Lieut. Harold H. George...	5	421 Jefferson Avenue, Niagara Falls, N. Y.
First Lieut. George W. Furlow...	5	504 West College Street, Rochester, Minn.
First Lieut. Arthur E. Easterbrook	5	(Major E. P. Esterbrook), Fort Flagler, Wash.
First Lieut. Byrne V. (E.) Bancom	5	Milford, Tex.
Second Lieut. Harold McArthur..	5	(No address).
Second Lieut. J. Sidney Owens...	5	15 Forrest Vieco Avenue, Raspburg P. Q., Baltimore Co., Md.

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Honors

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Second Lieut. Elmore K. McKay, Observer, A. S.

Second Lieut. Elmore K. McKay, Air Service, observer, 96th Aero Squadron. For extraordinary heroism in action near Dun-Sur-Meuse, France, Oct. 23, 1918. Lieutenant McKay, with First Lieut. Harry O. McDougall, pilot, while on a bombing mission displayed exceptional courage by leaving a comparatively secure position in the center of the formation during a combat with five enemy planes and going to the protection of two other officers whose planes had been disabled and forced out of the formation. While his pilot skillfully maneuvered the machine, Lieutenant McKay shot down one of the adversaries and fought off the others, thereby saving the lives of the officers in the disabled American plane. Home address, James D. McKay, father, 817 Eleventh Street, N. E., Washington, D. C.

First Lieut. Harry O. McDougall, Pilot, A. S.

First Lieut. Harry O. M'Dougall, Air Service, pilot, 96th Aero Squadron. For extraordinary heroism in action near Dun-Sur-Meuse, France, Oct. 23, 1918. Lieutenant McDougall, with Second Lieut. Elmer McKay, observer, while on a bombing mission, displayed exceptional courage by leaving a comparatively secure position in the center of the formation during a combat with five enemy planes and going to the protection of two other officers whose planes had been disabled and forced out of the formation. Lieutenant McDougall skillfully maneuvered his machine so as to enable Lieutenant McKay to shoot down one of the adversaries and fight off the others. Home address, D. C. McDougall, father, 132 South Hayes Street, Pocatello, Idaho.

Lieut. Kingman Douglass, Pilot, A. S.

Lieut. Kingman Douglass, Air Service, pilot, 91st Aero Squadron. For extraordinary heroism in action near Longuyon, Oct. 31, 1918. While on a photographic mission Lieutenant Douglass encountered a superior number of enemy pursuit planes. Notwithstanding the odds against him, he turned and dived on the hostile formation, destroying one plane and damaging another. He then continued on his mission and returned with photographs of great military value. Home address, W. A. Douglass, 317 North Kenilworth Avenue, Oak Park, Ill.

Capt. Walter R. Lasson, Observer, A. S.

Capt. Walter R. Lasson, Air Service, observer, 91st Aero Squadron. For repeated acts of extraordinary heroism in action near St. Mihiel, France, July 30 and Sept. 13, 1918. This officer showed rare courage on a reconnaissance far over the enemy lines, when he continued on his mission after being seriously wounded by anti-aircraft fire. On Sept. 13, although he was still convalescing from his wound, he volunteered for a particularly dangerous mission requiring a flight of seventy-five kilometers within the enemy lines. Because of weather conditions he was forced to fly at a dangerously low altitude and was repeatedly fired on by anti-aircraft and machine guns. He successfully accomplished his mission and returned with important information. Home address, Mrs. W. R. Lasson, wife, Birmingham, Ala.

First Lieut. Harvey Conover, Pilot, A. S.

First Lieut. Harvey Conover, Air Service, pilot, 3d Observation group. Deceased. For extraordinary heroism in action near Consenvoye, France, Oct. 27, 1918. Flying at an altitude of less than fifty meters over enemy artillery and machine guns, which were constantly firing on him, Lieutenant Conover and his observer staked the American front lines and gave valuable information and assistance to the advancing infantry. Although suffering from two severe wounds, and with a seriously damaged plane, he delivered a harassing fire on six enemy machine-gun nests which were checking the advance of the ground troops, and successfully drove off the crews of four guns and silenced the other two. He then made a safe landing and forwarded his information to division headquarters before seeking medical aid. Home address, L. P. Conover, father, Hinsdale, Ill.

First Lieut. Allan P. Bonnalie, A. S.

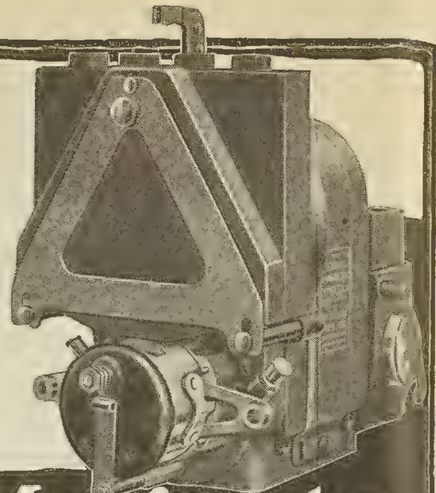
Allan P. Bonnalie, first lieutenant, Aviation Section, an American aviator attached to the Royal Air Force, who has been awarded the British Distinguished Service Order. On Aug. 13, 1918, this officer led two other machines on a long photographic reconnaissance. In spite of the presence of numerous enemy aircraft they were able to take all the photographs required, but were attacked by six Fokker biplanes. During the combat Lieutenant Bonnalie saw that one of his accompanying machines was in difficulty and that an enemy airplane was nearly on its tail. He at once broke off combat with the enemy with whom he was engaged and dived to the assistance of the machine in trouble. He drove off the enemy plane, regardless of the bullets which were ripping his own machine. Eventually, however, his tail planes and his elevator wires were shot away and his machine began to fall in side slips. Lieutenant Bonnalie managed to keep his machine facing toward the British lines by means of the rudder control, while his observer and the third machine drove off the enemy aircraft, which was still attacking. In its damaged condition Lieutenant Bonnalie's machine was tail heavy, and he therefore had his observer leave his cockpit and lie out along the cowl in front of the pilot. In this manner he recrossed the British trenches at a low altitude and righted his machine sufficiently to avoid a fatal crash. Had it not been for the gallantry of Lieutenant Bonnalie the injured machine to whose assistance he went would have fallen into enemy territory, as pilot had been wounded and its observer killed. Lieutenant Bonnalie's own machine was riddled with bullets and it was a marvelous performance to bring it safely to the ground.

First Lieut. Winfred C. MacBrayne, Observer

First Lieut. Winfred C. MacBrayne, Field Artillery, observer. For extraordinary heroism in action near Fismes, France, Aug. 26, 1918. While he was conducting an aerial reconnaissance and general surveillance from his balloon, Lieutenant MacBrayne was repeatedly attacked by hostile aeroplanes, and continued his mission despite the proximity of strong enemy air patrols against which he had no defense. When an enemy Fokker emerged from law-hanging clouds, firing at the balloon with incendiary bullets, Lieutenant MacBrayne remained in the basket until his companion, who was making his first ascension, had safely jumped. He leaped when the balloon was nearer the ground and his parachute opened as he crossed into the woods. Lieutenant MacBrayne insisted upon reascending immediately, thereby displaying conspicuous coolness and determination. Home address, Mrs. Marguerite V. MacBrayne, wife, 400 East Merrimac Street, Lowell, Mass.

First Lieut. Leo C. Ferrenbach, A. S.

First Lieut. Leo C. Ferrenbach, Air Service. For extraordinary heroism in action near Ansauville, France, July 22, 1918. Lieutenant Ferrenbach, a balloon observer, was conducting an important



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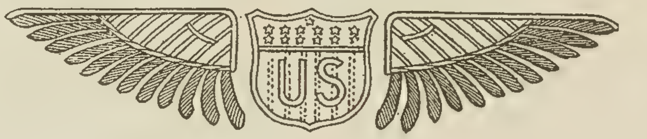

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surveillance of his sector when at an altitude of 800 meters successive attacks were made upon the balloon by enemy planes. This officer refused to leave his post and continued his work with strong enemy patrols hovering above him until one of the hostile machines dived and set fire to the balloon. After he had jumped in his parachute, the burning balloon fell and barely missed him. Lieutenant Ferrenbach immediately reascended while enemy patrols were still in the vicinity. Home address, Edward J. Ferrenbach, father, 5441 Bartmer Avenue, St. Louis, Mo.

Second Lieut. Cleveland W. McDermott, A. S.

Second Lieut. Cleveland W. McDermott, Air Service, 147th Aero Squadron. For extraordinary heroism in action near Bantheville, France, Oct. 18, 1918. In starting on a patrol mission Lieutenant McDermott was delayed by motor trouble. Unable to overtake the other machines, he continued on alone. Sighting an enemy Fokker, he immediately gave chase, and despite its effort to escape, succeeded in shooting it down. Six Fokkers then suddenly attacked him, and though he was outnumbered and blinded by the sun, he shot down one of them and scattered the others. In the midst of this combat his motor stopped, and he was forced to glide into friendly territory. Home address, John McDermott, father, 209 Jackson Street, Syracuse, N. Y.

First Lieut. Cleo. J. Ross, A. S.

First Lieut. Cleo J. Ross, deceased, Air Service, for extraordinary heroism in action near Brabant, France, Sept. 26, 1918. Lieutenant Ross was engaged in an important observation, regulating artillery fire, when his balloon was attacked by enemy planes. One of the planes dived from a cloud and fired at the balloon, setting fire to it, and although he could have jumped from the basket at once he refused to leave until his companion, a student observer, had jumped. Lieutenant Ross then leaped, but it was too late, for the burning balloon dropped on his parachute. He was dashed to the ground from a height of 300 meters and killed instantly. Next of kin, E. M. Ross, father, Titusville, Pa.

First Lieut. Ralph O'Neill, A. S. (Bronze Oak Leaf)

First Lieut. Ralph O'Neill, Air Service, pilot, 147th Aero Squadron, for the following act of extraordinary heroism in action near Fresned, France, July 24, 1918. A bronze oak leaf is awarded to Lieutenant O'Neill, to be worn on the distinguished service cross awarded to him Oct. 12, 1918: Lieutenant O'Neill, with four other pilots, engaged twelve enemy planes discovered hiding in the sun. Leading the way to an advantageous position by a series of bold and skillful maneuvers, Lieutenant O'Neill shot down the leader of the hostile formation. The other German planes then closed in on him, but he climbed to a position of vantage above them and returned to the fight and drove down another plane. In this encounter he not only defeated his opponents in spite of overwhelming odds against him, but also enabled the reconnaissance plane to carry on its work unmolested. Home address, Mrs. R. L. O'Neill, mother, 218 Sonoita Street, Nogales, Ariz.

Second Lieut. Charles W. Chapman, A. S.

Charles W. Chapman, second lieutenant, Aviation Section, Signal Reserve Corps. On May 5, 1918, in the region of Autrepierre, while on patrol duty, he courageously attacked a group of four monoplanes and one biplane and succeeded in bringing one down before he himself was shot down in flames.

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Personals

Capt. Edward V. Rickenbacker, the American "ace," will be the guest of the contest board of the American Automobile Association at a dinner at the Waldorf-Astoria, New York City, on February 3.

George Baekeland, who recently returned from Italy, where he served with the United States Air Service, was married January 15 to Miss Cornelia Fitch Middlebrook of 574 Lexington avenue, New York. The ceremony was performed at the home of Frederic Middlebrook, an uncle of the bride, at the Wyoming Apartments, by the Rev. Francis T. Brown of Yonkers. The bridegroom is the son of Professor and Mrs. Leo Baekeland of Yonkers. His father is a well known Belgian inventor.

Capt. Clifford B. Harmon, one of the pioneers in this country in aviation, the first man who flew over Long Island Sound, and whose license as a pilot is numbered 6, returned on the Lapland, Jan. 19, from a mission for the Government in France. He did some flying over there, but engaged in no fighting. Among the other aviators on board the Lapland were Lieutenants Shorney, Briggs, Gifford, Smith, McAteer, Folger, Pearson, Stewart, Stevens, Ford, Evens, Leonard, Strong and Prior.

Major Martin H. Ray, A. S., A., stationed at Rockwell Field, is ordered to report to the Director of Military Aeronautics for duty.

Capt. Roderick Tower, A. S., A., is ordered from duty at the Air Service Depot, Garden City, N. Y., to Washington, D. C., where he is to report to the Director of Military Aeronautics.

Capt. Clarence Minnick, M. C., in addition to his other duties at Post Field, is assigned to duty as officer in charge of the physical examination unit and medical member of the Aviation Examining Board, and also recruiting officer of the Air Service, Aeronautics. Captain Minnick relieves Capt. John F. Duckworth.

Major H. D. Moore, A. S., P., is assigned to duty in the office of the Director of Purchase and Storage, General Supplies Division, General Staff.

Capt. Frank A. Johnston, M. C., is relieved from duty at the United States School of Military Aeronautics, Texas State University, and ordered to Hazelhurst Field for a course of instruction at the medical research laboratory.

Major George W. Krapf, J. M. A., Signal Corps, is ordered from Kelly Field to duty at Camp John Wise.

Capt. Francis A. Connolly has resigned from the Air Service, Aeronautics, and his resignation has been accepted by the President to take effect on Nov. 18.

Capt. Joseph H. Bean, S. C., is ordered to report to the Commanding Officer of the First Reserve Wing at Hazelhurst Field.

Major John W. Simons, Jr., S. C., has been appointed Commanding Officer of Park Field. Major Simons had been on duty at Langley Field.

Flying Fields

Post Field

An entertaining New Year's dance was held at the Officers' club. The big dining hall and the reading room of the club were fancifully decorated. Cleverly drawn cartoons showing Pierrot in a "Teddy Bear" suit and aviator's helmet pursuing an airy Pierrette, and aviators in giddy positions megaphoning New Year's greetings to the earth and to each other were the features about which the rest of the decorations were grouped. Brig. Gen. Dennis H. Perry, commanding general of Fort Sill and Mrs. Perry, Col. R. E. D. Hoyle, commanding officer of the School of Fire and Mrs. Hoyle were among the guests.

A post-season football game resulted from the rivalry of "F" and "A" squadrons. "A", already recognized champion of Fort Sill reservation, won in very impressive fashion by a score of 12—0. The afternoon of December 19 on which the game was played was made a holiday and most of the personnel attended the match. The Post Band headed the parade of the squadrons which preceded the game.

Joseph Leopold Joins Jones-Motrola, Inc.

Joseph Leopold, who before the war was chief engineer for the Walker M. Levett Company, manufacturers of aluminum pistons for airplane engines, has been discharged from the Air Service, U. S. Army, in which he was a lieutenant in the Department of Aeronautics, and has joined the organization of Jones-Motrola, Inc., New York City, of which Joseph W. Jones, inventor of the Jones speedometer, is president, and Robert Graves, secretary and treasurer.

Mr. Leopold will be mechanical engineer and sales manager, and will assist Mr. Jones in the research and experimental work carried on by Jones-Motrola, Inc., in which present development is concentrated on tachometers, air speed indicators, odometers, speedometers and special instruments for the automotive industries.

French Studying Airplane Routes

The French Government is studying a proposition for about twenty aerial lines connecting Paris with the chief towns of France and the great foreign centres.

U.S.

U. S. Letters for collar insignia as prescribed by General Orders No. 74

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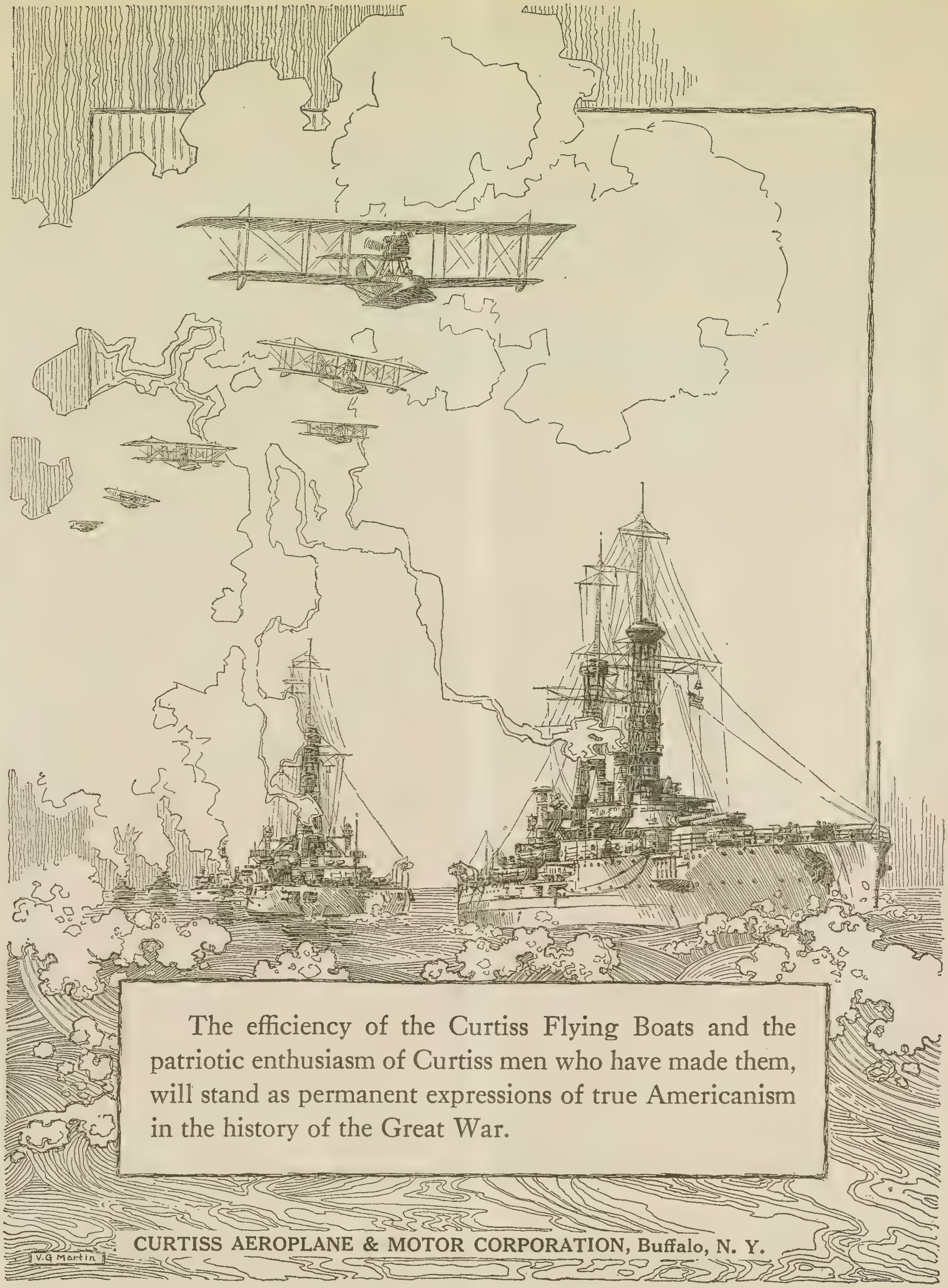

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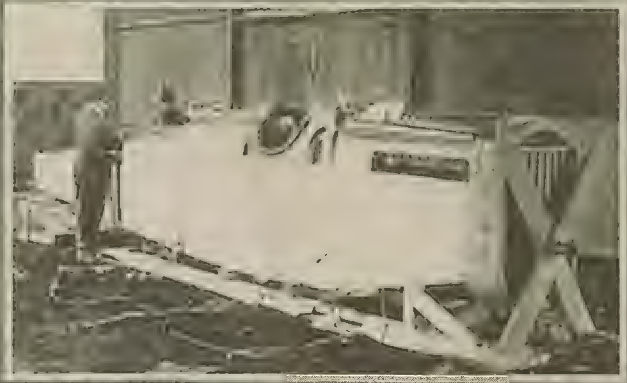

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Demoralizing Blow to Air Service Is Dealt by the General Staff

Sec'y Baker's Bill In Some Parts Is Destructive

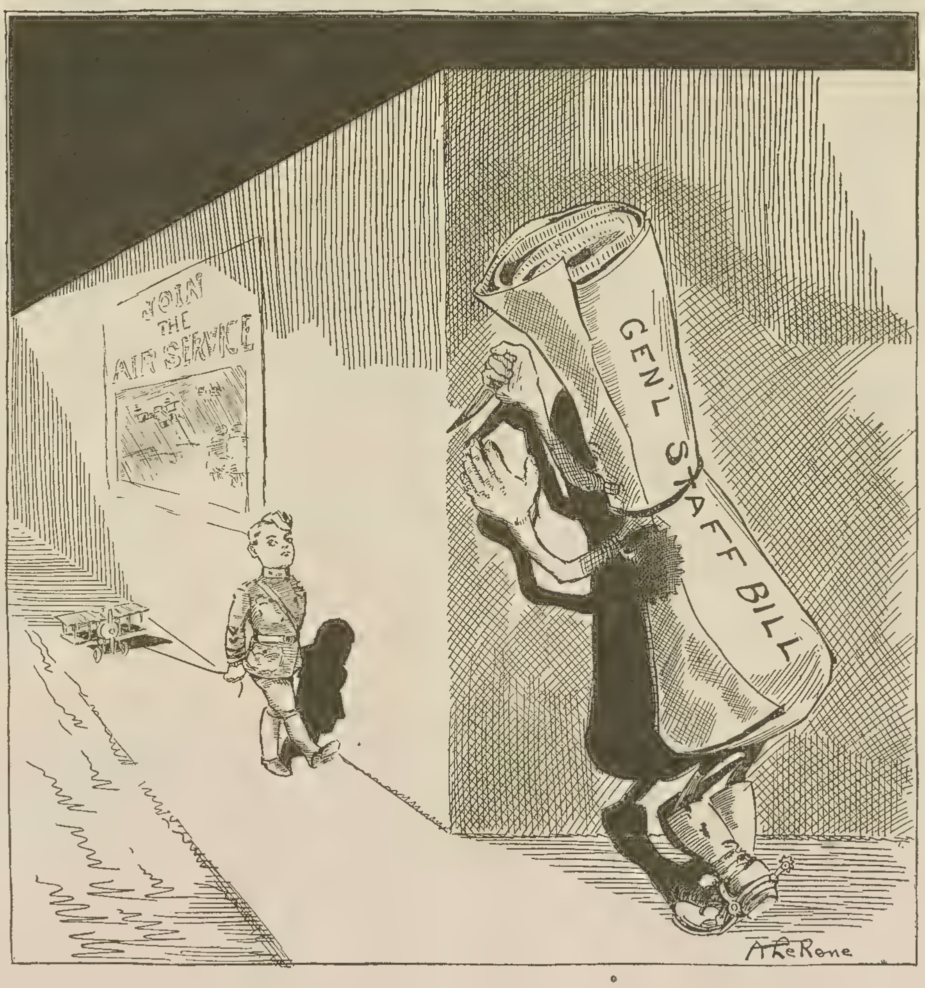
NEEDS AMENDMENT

Does Not Treat Service as a Combatant Force

Makes It a Minor Branch of War Department

ASTOUNDING MOVE

Quick Action Wanted to Bring About Changes



Another Atrocity

No greater blow to the Air Service has been struck than in the bill presented by the Secretary of War, which contains the plan for a peace time Air Service. This bill has hidden in its general provisions several particularly obnoxious clauses, which, if enacted, will make the Air Service a subordinate branch of the War Department instead of the 'fourth arm" of the service.

The "Bill to reorganize and increase the efficiency of the Regular Army," introduced by Mr. Dent and known as H. R. 14,560, allows the Air Service "one major general, one brigadier general, twenty-two colonels, forty-five lieutenant-colonels, 126 majors, 438 captains, 696 first lieutenants, 594 second lieutenants, 515 master signal electricians, 2282 sergeants, first class, 1737 sergeants, 134 mess sergeants, 2485 corporals, 134 buglers, first class, 2738 wagoners, 584 cooks, 4366 privates, first class, 134 buglers and 6744 privates."

Where the Danger Is

It is only when the general provisions of the bill are studied that the danger to the Air Service becomes evident. The Air Service is not made a separate branch of the Army like the Infantry, Cavalry and Field Artilery, but is placed in the same status as the Ordnance Department, Signal Corps, Tank Corps or Motor Transport Corps. It indicates that the General Staff, which prepared the bill, does not regard the Air Service as a combatant force which can act independently.

But even the status above outlined is further subordinated by the paragraph (Sec. 31) regarding the "appointment of officers." It provides that "Hereafter all appointments of officers in grades below that of brigadier-general shall be by commission in the Infantry, Cavalry, Field Artillery, Coast Artillery Corps, Corps of Engineers or one of the corps of the Medical Department, etc. . . . Officers for duty in branches herein authorized and in which officers are not commissioned *shall be obtained by temporary details* from among officers of corresponding grades in other branches, but no officer below the grade of lieutenant-colonel shall be detailed to duty detaching him from the branch in which he is permanently commissioned for more than four years in any period of six years, except in time of actual or threatened hostilities."

Officers to Be Detailed

This means clearly that all Air Service officers will have to obtain their commissions in the Infantry, Cavalry, etc., and be detailed to the Air Service; and as the bill also provides for promotion by selection, it will become almost impossible to secure officers to leave their branch where promotions are made by excellence of work and go into a highly specialized branch which they know they will have to leave within four years. The old advantage of increase of grade is also abolished by the clause "All laws providing that details of officers on aviation duty shall carry advanced rank are hereby repealed."

If the General Staff believes that an Air Service of highly skilled specialists can be built up by detailed officers, it shows clearly the low opinion it holds for this force.

Amendments Necessary

The bill should be given the treatment it deserves by Congress. The Air Service should be made at least a separate branch of the Army and its commissioned personnel continuous and permanent.

No greater argument for a separate Air Service has ever been made than this measure, and its very extreme point of view is its sole redeeming feature: If the bill had been less drastic it could not be so open to successful attack. If a high morale is to be maintained in the Air Service it must be made attractive and warrant officers devoting their fullest energies to its upbuilding. This bill, if not amended, will destroy every particle of hope that the Air Service has for a future as a branch of the Army.

The hope of the country that the best of the fliers, who have made such brilliant records on the front, would remain in the service is shattered by the removal of hope of advancement except by long years of service. These men will not stay in a service which has officers of the higher grades detailed from other branches.

Every person interested in the Air Service should communicate with Senators and Representatives so that they will see to it that this bill is not passed in its present form and that new provisions are drawn which will establish the Air Service on a prominent basis as a separate arm which at the proper time could become a separate service.

Advance in Airplane Construction

It was to be expected that the increased rank for flying duty would be abolished. In peace time before the war, the Air Service was more hazardous than other branches, but the great advance in airplane construction has changed the situation so that the Air Service is now considered relatively in the same class as other branches of the army. Increased pay for flying status will compensate officers for the extra hazard and will save the Air Service from the criticism that has been made by officers in other branches which under war conditions have been equally as dangerous as air combat.

There is no provision implied in the Bill for a continuation of the dual system of a Department of Military Aeronautics and Aircraft Production. This is to be welcomed for the arrangement is clearly one that is only proper under war conditions where a large civilian organization is required to assist in expanding production.

When the reports from England as to the plans made for the development of aviation are read, it makes the American plans for the future military aeronautics seem trivial. The British government intends to permit General Brancker to hold the dual position as officer in the Air Force and engage in commercial aeronautics as well, an innovation which indicates to what lengths Great Britain intends to go to secure supremacy of the air, military, naval and commercial.

HOW CIVILIANS MAY OBTAIN A LICENSE

Forms Prepared by the Board on Aeronautic Cognizance

LIBERAL POLICY EXPECTED

So Far, However, the Matter of Carrying Passengers Seems to Require Not a Little Clarification

The Joint Army and Navy Board on Aeronautic Cognizance, consisting of Major-General W. L. Kenly, Rear Admiral William R. Shoemaker, Capt. N. E. Irwin U. S. N., Col. H. H. Arnold A. S., A., Col. C. E. Brigham, C. A. C., and Capt K. M. Bennett, U. S. N., have prepared forms for the application for and granting of licenses.

The application indicates that not only will pilots be required to take out licenses, but that the passengers carried will have to be certified. As space is left for only two names for passengers the whole matter of passenger carrying seems to be still uncertain. If a pilot has to secure a separate certificate for each passenger, there are few pilots who will care to go into the business.

The Board intends to keep a strict record of all flights made as is shown from the following regulations made for licenses:

Application for License

License for making flights in civilian aircraft is desired under the following terms and conditions:

(Make separate application for each aircraft.)

License to be issued to:

Name..
Address......................................
Description of aircraft......................
Owner..
....
Address......................................
To be operated by............................
Address......................................

If passengers to be carried, give name and addresses:

Name.............. Address.............
Name.............. Address.............
Territory in which flights are to be made....
....
Purpose for which flights are to be made....
....
License to be valid from........to........
(Date) (Date)

Names and addresses of three references to whom applicant is well known:

Name.............. Address.............
Name.............. Address.............
Name.............. Address.............
Date of first solo flight made by pilot........
Date of R. M. A. test.........................
Service in the U. S. Army.....................

An authenticated copy of a certificate or license as evidence of pilot's qualifications must be submitted.

Signature of applicant:

Name..
Address......................................
Date...

This application, after being properly executed, should be sent to
THE JOINT ARMY & NAVY BOARD ON AERONAUTIC COGNIZANCE, Bldg. "D," 6th and B Sts., Washington, D. C.

License for Flying in Civilian Aircraft

By virtue of authority conferred by Proclamation of the President of the United States of America (No. 1432) February 28, 1918, regulating the flying of civilian aircraft, the Joint Army and Navy Board on Aeronautics Cognizance herebdy issues this License to

Address......................................
Name...

to conduct flying in civilian aircraft in accordanec with the following terms and conditions:

Description of aircraft......................
Owner..
Address......................................
Identifying mark on aircraft (to be described on reverse side of this License)..........
To be operated by............................
Address......................................

Names and addresses of passengers to be carried:

....
....
Territory in which to be operated..........
Purpose for which flights are to be made....
....

This License is valid from............to
(Date)
............, unless sooner revoked.
(Date)

The attention of the Licensee is invited to Paragraph 4 of the above mentioned Procclamation. Instructions on the reverse side are a part of this License.

Issued by direction of the Joint Army & Navy Board on Aeronautic Cognizance this .... day of .... 1919.
THE JOINT ARMY & NAVY BOARD ON AERONAUTIC COGNIZANCE, Bldg. "D," 6th and B Sts., Washington, D. C.
1st Lieutenant, A. S. A.,
Secretary.

INSTRUCTIONS TO LICENSEE

(1) All licensed aircraft shall display the license number in contrasting colors placed as follows:

Heavier-than-air craft: On the upper surface of each upper wing and the under surface of each lower wing.

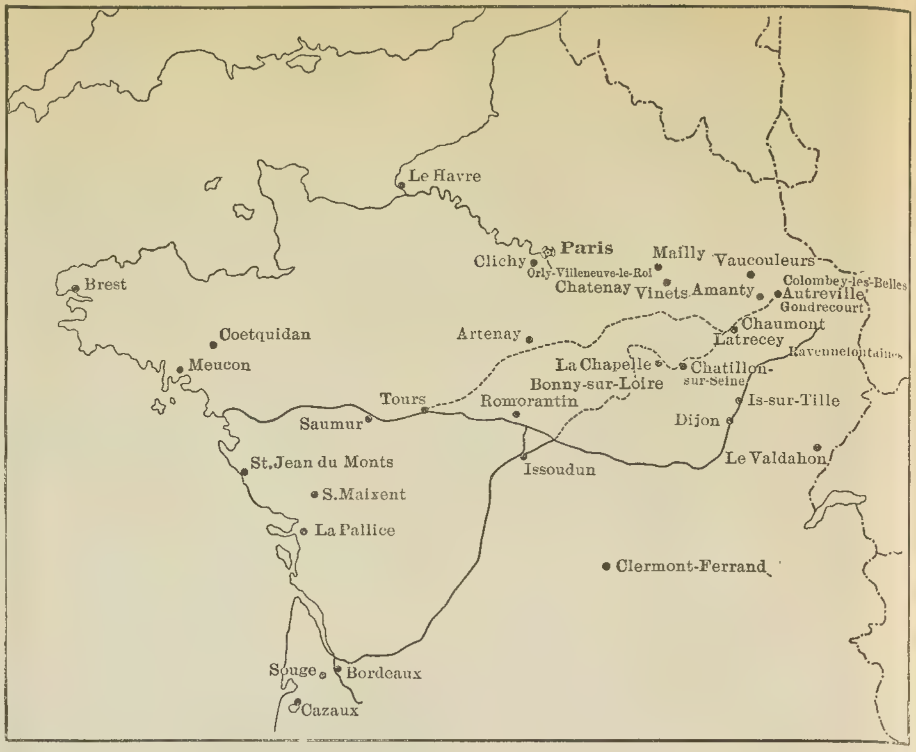
Lighter-than-air craft: On the upper half and the lower half, on opposite side from upper number.

All numbers will be five feet in height and nine inches in width of line, unless chord of wing is less than five feet in which case height of numbers will equal wing chord, with above proportion of width of line.

(2) A monthly report is required from the holder of this License, giving the date, duration and number of flights made by the aircraft of this license number.

(3) This License is issued by the Board and accepted by the Licensee on condition that same may be revoked at any time the Board considers it necessary or desirable to do so.

Up to the present time, it has been practically impossible for a civilian to secure a license, but it is hoped that pending a revocation of the Proclamation of the President prohibiting flying, that the Board will pursue a liberal policy.



Map of the American Air Establishments in France

Concentration Camp: St. Maixant. *Acceptance Park:* Orly. *Fabricating Plant:* Romarantin. *Depots and Warehouses:* Orly, Clichy, Paris, Villeneuve, Le Roi, Chatenay, Vinets, Colombay, Les Belles, Latrecey, Ravenne-Fontaines, Is-sur-Tille, Dijon, Romorantin. *Airdromes:* Romorantin, Artenay, La Chapelle, Bonny-sur-Loire, Vaucouleurs, Amanty, Chaumont, Autreville, Gondrecourt, Colombay, Les Belles. *Schools:* Coetquidan, Meucon, St. Jean Du Monts, Saumur, Tours, Issoudun, Mailly, Chatillon-sur-Seine, Le Valdahon, Souges, Cazaux, Clermont-Ferrand.

Airplane Patrol for the Forest

The forest service of the United States Department of Agriculture is desirous of installing an airplane patrol service in connection with its work of fire protection, but is unable to put the plan into effect because of an insufficient appropriation. This information became known through a letter written to the Standard Aircraft Corporation of New Jersey by John L. Hall, Acting Forester.

"We have given considerable thought to the use of aircraft in the fire patrol of the national forests," declared Hall. "I believe that they could be used to excelent advantage and would like very much the opportunity of giving them a thorough trial. The forest service, however, as a Government agency, is not prepared to purchase and operate a sufficient number of aircraft to adequately patrol the national forests; our appropriations are entirely too limited for a project of that magnitude.

"Similarly we are hardly in a position to ask Congress for additional funds for this purpose in view of the equipment now on hand by the Division of Military Aeronautics and also the fact that this division has numerous trained officers, observers, mechanics, etc. Briefly, we should like to have the Division of Military Aeronautics cooperate with the forest service in the patrol of national forests through the use of aircraft."

It is expected that the forestry bureau wil urge Congress to provide an arrangement whereby the surplus of Government airpanes on hand may be utilized for the important duties of forest patrol. The advantage of aerial scouting over the present methods has been forcibly impressed upon the forestry officials. A plan of operation similar to the one used in connection with the air-mail service is contemplated.

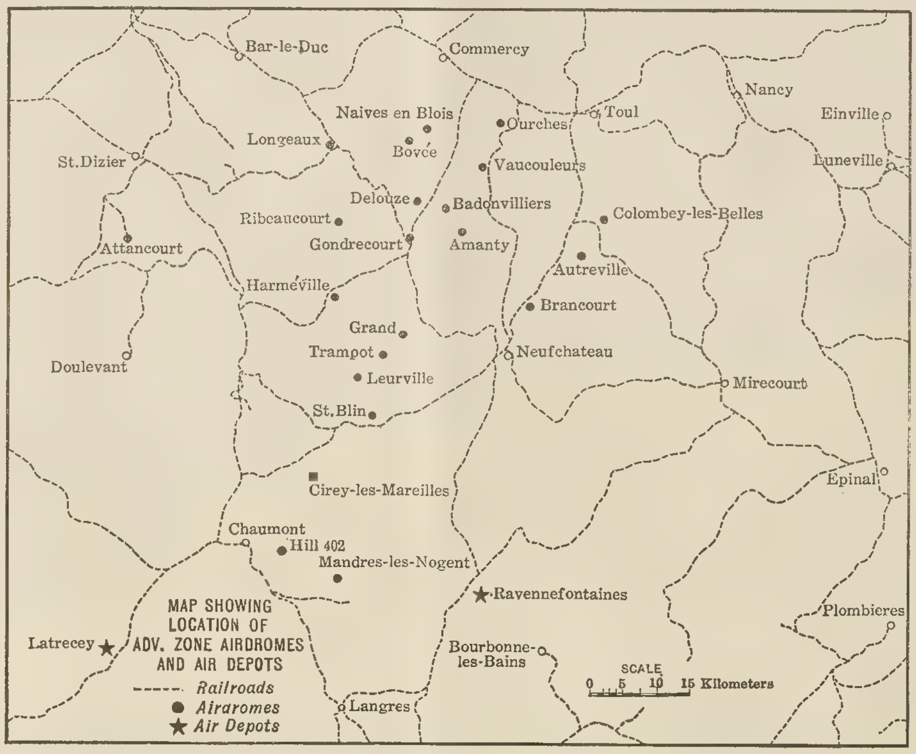
It has been estimated that thousands of dollars worth of valuable timber would be saved annually if flying machines were used for the detection of forest fires and the transportation of fire-fighting crews to the scenes of conflagration.

The Weather Bureau and the United States Geological Survey are also contemplating the utilization of airplanes. C. F. Marvin, Chief of the Weather Bureau, made this statement in Washington yesterday:

"Unquestionably meteorological observations in airplanes will eventually form an important feature of the Weather Bureau work. There is no reason to doubt that such observations, taken at short intervals of time and over widely distributed areas, would materially assist us in determining the depth, extent and intensity of storms, and, therefore, in increasing the accuracy of the weather forecasts."

The following letter was received by the Standard Aircraft Corporation officials from George Otis Smith, director of the U. S. Geological Survey:

"The Geological Survey, in cooperation first with the Council of National Defense, and later with the Engineer Corps of the Army, has for more than a year been engaged in the development of a method of mapping which involves the use of airplane photographs. The Geological Survey has not yet employed this method in its own work, but the investigations along this line are being continued."



American Advance Zone Airdromes and Air Depots

McCook Field For Experimental Tests

To promote peace-time development of the aircraft, the War Department has placed McCook Field, Dayton, Ohio, at the disposal of private enterprise for testing experimental types of machines. Regulations made public Jan. 27 provide that all unofficial tests shall be at the owners' risk and expense, and after examination of the machine by Army technical experts to determine its safety for trial in the air.

Official tests also will be conducted at McCook Field by Army pilots experienced in experimental work. For such trials owners must submit two machines, one for a destruction test and one for performance. The Government will defray the expense.

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BIG CRUSH OF EXHIBITS FOR THE SHOW

Not Only the Garden, But the 69th Armory Is Leased

FROM MARCH 1 TO MARCH 15

Desire of the Government to Make the Exposition Largely International in Character

Owing to the tremendous number of exhibits offered, the Manufacturers Aircraft Association has found it necessary to lease for its Annual Aeronautical Exposition not only Madison Square Garden but the 69th Regiment Armory as well. It was at first planned to hold the exposition late in February, but developments in cooperation with the Government made advisable a slight change in dates. As a result the exposition will be held from March 1 to March 15.

Show Wide in Its Range

It is believed that, inasmuch as interest in aeronautics is constantly increasing, it will require a fortnight to enable New York City to see the airplanes, airships and aeronautical applianecs that will be placed on view.

Arrangements for the exposition have brought the Show Committee of the Association into communication with a remarkable range of industries. The exhibitors, it is predicted, will include not only the airplane and motor manufacturers but the makers of parts, accessories and subsidiary elements that enter into the construction of this most modern product of science and industry—the flying machine.

Close-Up Views

The arena of the Garden has been charted. Effort is being made first to place the larger types. The members of the Manufacturers' Aircraft Association are completing their show plans as rapidly as possible and the principal companies have already made definite plans for space, exhibits and the manner of display.

It is the idea to have all airplanes where they may be seen close at hand. In the case of the Army and Navy it is understood that soldiers and sailors trained in flying, gunnery or mechanics will be stationed at the various exhibits to explain to the people what each part means and how it functions.

International in Character

It is not the aim to segregate the commercial, naval and military exhibits. Rather it is believed they will be distributed throughout both the Garden and the Armory. The desire on the part of the Government, it is said, is to make the exposition as international in character as possible. Thus the visitors will have an opportunity to see not only the products of American aircraft industry, but will be able to see examples of commercial and military construction from Great Britain, France and Italy. War trophies, of course, will represent Germany.

COL. ATKINSON HOME FROM THE WESTERN FRONT

Entire First Pursuit Wing, Except Capt. Philip J. Roosevelt, Returns

MANY DECORATED AVIATORS

All of Them Arrived on the George Washington, Which Reached New York on January 21

When the George Washington reached New York Jan. 21 many members of the A. E. F., Air Service, were aboard.

Of the men who wore decorations, the most prominent was Col. H. T. Atkinson, known as the "Father of the Army Aviation Service" through his command of the first American aero squadron organized on the Western front after the U. S. entered the war. Col. Atkinson has the Distinguished Service Cross, Legion of Honor, Croix de Guerre and Belgian War Cross. The entire First Pursuit Wing, of which he is in command, has returned, except Capt. Philip J. Roosevelt, military editor of *Aviation* and *Aeronautical Engineering*.

Among the others, and credited with nine planes officially and certain he downed at least six others, Lieut. William P. Erwin of Chicago holds the Distinguished Service Cross, Croix de Guerre and the War Medal of the Aero Club of America. In civil life he is a pianist.

On his third day out with his squadron, machine-gunning German troops in the Argonne, his observer was killed. He got the airplane back, and for this he got the Croix de Guerre.

Another of his exploits occurred four days before the armistice was signed, when he and his observer, Arthur Easterbrook of Seattle, were shot down after strafing German troops in retreat. The plane landed in the German lines. Operating their machine guns, Erwin and Easterbrook kiled the crews of two Germain machine guns and held others at bay until nightfall, when they dashed back to our lines.

Capt. Arthur Coyle of Concord, N. H., commander of the First Aero Squadron, has the Croix de Guerre for driving off four German planes that were interfering with his photographic mission at Chateau-Thierry. At the Argonne he drove down a plane when he was out on a flight and when attacked by four on the return trip, sent one of them crashing. He received the D. S. C. for this.

Quentin Roosevelt Cited by France

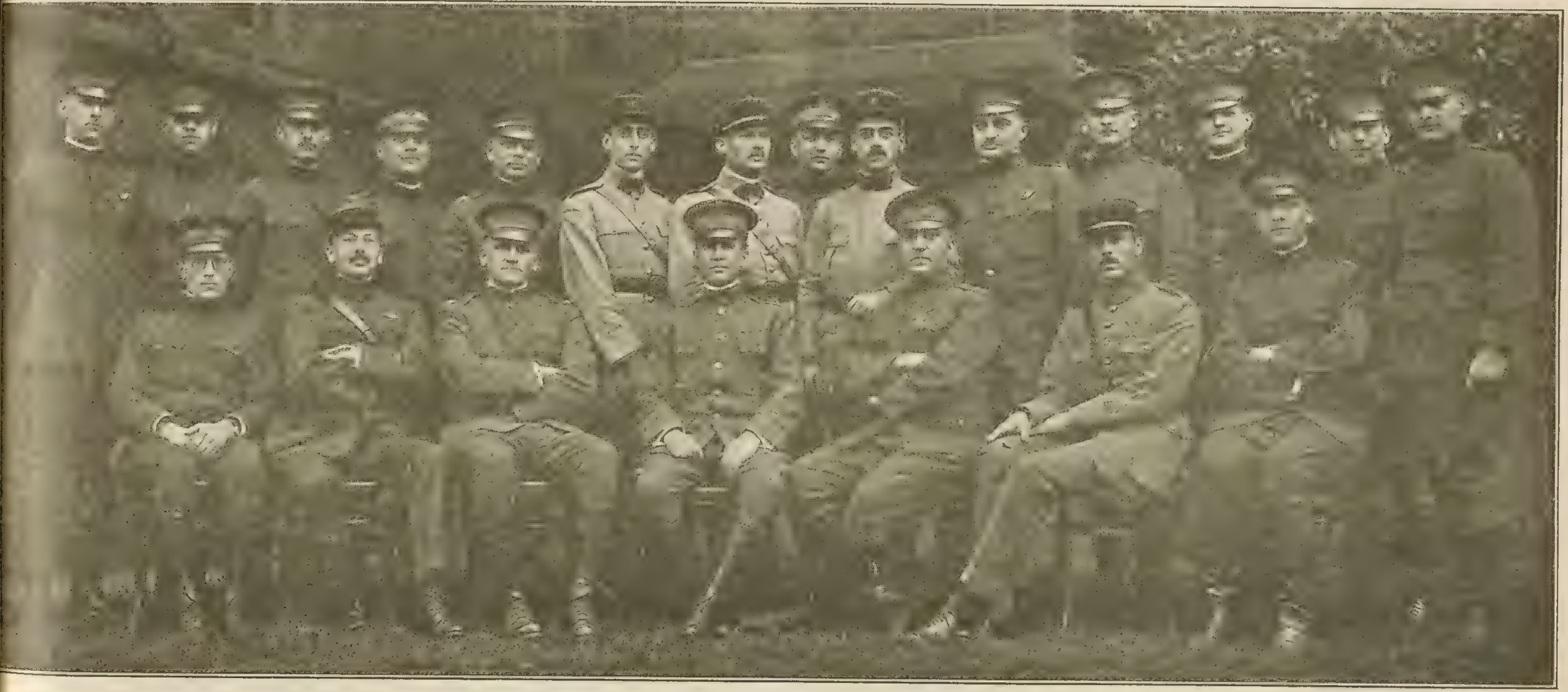
Citations for 208 Americans are contained in French army orders, according to the latest *Official Journal*. The list includes Lieutenant Quentin Roosevelt, Major-General John A. Lejeune, Brigadier-Generals A. J. Bowley and W. C. Neville, Colonels William S. Mitchell, Hug G. Myers, Jr., Edward Davis, Hiram I. Bearss, Edward Stone, James Rhea, and Frederick L. Wyatt; Aviators Edward V. Rickenbacker and Douglas Campbell, and Chaplain Thomas G. Speers.

The citation of Lieutenant Quentin Roosevelt reads:

"An excellent pilot and scout, possessing the highest qualities of courage and devotion to duty. On July 10, 1918, in a combat with five enemy machines he brought down one of his adversaries. He gloriously fell in the course of an aerial combat on July 14, 1918."

To Sell Naval Uniforms at Cost

House bill 12945, authorizing the Government to furnish at cost uniforms, accoutrements and equipment to officers of the Navy, Marine Corps and Coast Guard and midshipmen of the Naval Academy, was passed by the Senate without roll call.



Col. A. L. Fuller, Chief of Balloon Service, and Staff

Front Row, Sitting Left to Right: Capt. H. W. Treat, Major L. P. Bonvillian, Col. James Prentice, Col. Arthur L. Fuller, Major R. S. Bamberger, Lieut. C. M. Crivelli, Capt. Alfred P. Grimm.

Back Row, Standing Left to Right: Lieut. Wm. D. Simpson, Lieut Victor S. Caldwell, Lieut. Geo. B. Thummel, Capt. Thomas A. Grant, Capt. Edward S. Halsey, Lieut. A. M. Lemaire, Lieut. C. G. Loudin, Lieut. H. J. Tillou, Lieut. M. L Ohrlac, Capt. Carl J. Schiller, Capt. Clifford E. Smythe, Lieut. Edw. Schoeppe, Lieut. S. A. Woolner, Lieut. C. W. Merrell.

SNAP SHOTS FROM ALOFT

Just what the future of the reserve officers in the Air Service is to be is so uncertain as to make the subject one difficult to discuss. At present any commissions have to be issued under the law providing for an Aviation Section, Signal Reserve Corps, which leaves the officers so commissioned in a doubtful status in relation to the Air Service. With the great problems of demobilization and cancellations of contracts, the War Department has necessarily let such matters as the reserve force continue to function on present lines. When a plan can be formulated as to what the future of the Reserve Corps, National Guard and Regular Army will be, in all probability the Air Service Reserve Corps will be properly taken care of.

Meanwhile very few of the officers who have rendered the most valuable service during the war are applying for reserve commissions owing to the uncertainty as to what obligations they are assuming. This situation can probably be remedied in time by offering these discharged officers inducements which will tempt them to continue their connection with the air program.

In " the scrapping of one billion dollars," done so blithely by the Administration, the actual value of these fliers to the Government itself appears to have been ignored. Whatever may be the future of aeronautics commercially, the necessity for a large and skilled United States military air force has been too thoroughly demonstrated in the last few years to admit contention. The country spent millions of dollars to fit nearly 10,000 young men as aviators. On November 11, 1918, the United States Air Service was the second largest in the world. Two months later the morale of the service had been " shot to pieces " by the adoption of a policy of rapid demobilization and " watchful waiting " for developments of the Peace Conference.

Airplane Glue From Cows Milk

The aerial achievement of the famous cow in the nursery rhyme is rivaled by that of members of the University of Wisconsin herd. Their milk has been used to make a glue which is probably the most effective kind in the world for holding airplane parts together in flight. The Forest Products laboratory has been experimenting with casein, which is the white solid substance precipitated from milk on souring, and has developed from it this remarkable glue.

What makes this glue particularly valuable, in addition to its great adhesive qualities, is its resistance to water. An airplane in which casein glue is used can fly through mist and rain clouds or stay out in the stormiest weather without the slightest danger of its glue points weakening. The test which the laboratory gives this glue is perhaps the most striking demonstration of its waterproof quality. Blocks of wood glued with the casein glue to be tested are first soaked ten days in cold water and then kept for twenty-four hours in boiling water. If at the end of this test it shows no loss of strength, it is pronounced water-resistant enough for airplane use.

Casein has been put to a number of strange uses. For example, in addition to eating it all your life, you have probably combed your hair with it, polished your shoes with it, played billiards with it, worn collars of it, or played ragtime on it. Heretofore, outside of its uses for food, it has been made into imitation ivory, paints, glazes, and ointments.

From Australia to London by Air

A company has been formed under the name of the Aerial Service Limited of Australia to finance an aerial transport flight from Australia to London. The voyage will be made by way of the Dutch East Indies and Bagdad. The air line from Australia to London is perhaps 2,000 miles shorter than any of the routes used now.

By water this trip now takes about thirty days. It is estimated that it can be made in the air in five days.

Bombing Experience of Marine Fliers

Official report, in detail, of the capture by the Dutch of Lieut. Frank Nelms, Jr., United States Marine Corps, Aviation Section, and his internment in Holland, has just been received from France.

Lieutenant Nelms, whose home address is 52 South 48th Street, Philadelphia, Pa., was pilot of the plane D-11, with Lieut. Edmund D. Gibbs of New York as his observer and bomber. They were attached to the Day Bombing Wing of the Northern Bombing Group, and had been operating together for about three months, making one successful raid after another into German territory.

On the morning of Oct. 27, 1918, the Day Bombing Wing was instructed to fly over and bomb Lokeran, Belgium, a railroad junction used by the enemy for the shipment of food and munitions to their front lines. The formation despatched included the D-11. Lokeran meant a 75-mile flight.

The trip over was successful. The station and the railroad yards containing the supply trains had been bombed and all roads crippled, but the enemy sent up a formation of planes to give battle to the Marines. However, they held such perfect formation and worked so effectively that the Huns seemed afraid to attack, even though they greatly outnumbered the Marines. They followed them instead.

As they neared the Holland border, Lieutenant Nelms discovered he had engine trouble, and that it was serious enough to make a landing absolutely necessary. He shot the signal to the flight commander that he would have to go down and left the formation.

When the enemy formation saw the Marine plane descending, it began to close into attack, but the enemy had not counted upon the wisdom of the flight commander. Like a protecting blanket, the commander led his formation over the crippled plane, descending slowly just above it. The act was so unusual and so efficiently executed, the Huns were unable to reach the falling plane.

The D-11 landed in the little town of Schoondijk, Holland, in Zeeland Avenue, at 11:55 a. m. The flight commander saw the plane safely down and led the flight back to its base with the Hun formation following like a docile hound. It is contrary to orders when on a purely bombing raid to break formation and attack enemy planes unless molested by them.

Lieutenants Nelms and Gibbs were arrested by the Netherlands troops, their machine taken and themselves interned and sent to The Hague, where they were kept until the armistice was signed. They were then released and rejoined their squadron. These officers returned to the United States with the Marine Corps Aviation Unit on the S. S. Mercury.

Census Bureau Follows Air Service

Building D, at Four and One-Half and Sixth streets and Missouri avenue, N. W., Washington, D. C., which was built for and is now occupied by the Air Service, is to be used in part by the Census Bureau in the work of taking the next census. On account of the demobilization of the Bureau of Aircraft Production, it is estimated that about one-half of the space it occupies will be available to the Census Bureau on or about July 1 next.

NEW RECORD FOR LOENING'S MONOPLANE

Climbed to 19,500 Feet with Three Passengers

MAJOR SCHROEDER, PILOT

Previous Altitude for Monoplane with Three Passengers Is Given as 16,000 Feet

Major R. W. Schroeder, Air Service, the holder of the American altitude record, established a new record for monoplane altitude on Saturday, January 18, at Dayton, Ohio.

According to a telegram just received from the Chief of the Technical Section, Division of Military Aeronautics, McCook Field, Dayton, Ohio, the Loening monoplane climbed to nineteen thousand, five hundred feet, with three passengers totaling four hundred, seventy pounds. The pilot was Major R. W. Schroeder, the Observer, Lieut. George V. Elsy, and mechanician, K. A. Craig. The previous altitude record for a monoplane with three passengers is understood to be about 16,000 feet.

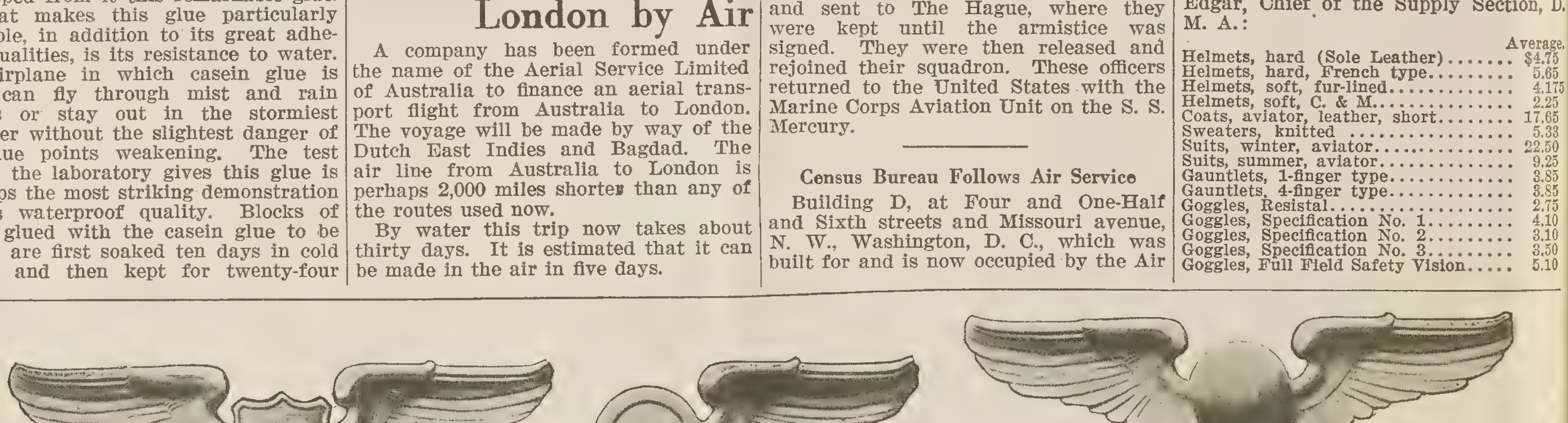
A report from Mr. Loening gives the time as thirty-nine minutes, which would average approximately 500 feet per minute.

The plane piloted by Major Schroeder was the two-seated Loening monoplane built by Grover C. Loening of Long Island City, N. Y. The power plant is an eight cylinder Hispano Suiza engine, which has driven the monoplane as fast as 145 miles per hour.

Prices Fixed on Officers' Equipment

For the purpose of making settlement with officers, who have either lost or purchased aviators' clothing and equipment, the following list of prices has been sent, for their guidance, to the Commanding Officers of all fields, posts, schools, depots, etc., at the direction of Major-General Kenly, by Col. C. G. Edgar, Chief of the Supply Section, D. M. A.:

	Average.
Helmets, hard (Sole Leather)	$4.75
Helmets, hard, French type	5.65
Helmets, soft, fur-lined	4.175
Helmets, soft, C. & M.	2.25
Coats, aviator, leather, short	17.65
Sweaters, knitted	5.33
Suits, winter, aviator	22.50
Suits, summer, aviator	9.25
Gauntlets, 1-finger type	3.85
Gauntlets, 4-finger type	3.85
Goggles, Resistal	2.75
Goggles, Specification No. 1	4.10
Goggles, Specification No. 2	3.10
Goggles, Specification No. 3	3.50
Goggles, Full Field Safety Vision	5.10



New Air Service Insignia Which Has Aroused Criticism

The insignia that have been adopted by the Air Service to take the place of the present wings will be a surprise to all who have admired the present design.

The military aeronaut wings is an anomaly as the wings are attached to a prehistoric type of free balloon. The reason for an aeronaut being designated as such with wings has always been a mystery, but when the balloon has been in silver lace, the conventionalization has not been as pronounced.

The observer continues to have as his badge of distinction a single wing without proportion or balance. Our allies give the observer an attractive insignia set at an angle which clearly satisfies the eye and does not make it obviously a make-shift. The U. S. in the circle resembles a commercial coat button.

The aviator wings have the merit of simplicity if not beauty. Resentment is felt in the service over changing insignia with each whim of artistic genius and if it is not too late it is hoped to have the matter reconsidered.

"STANDARD" Postal Planes Make Remarkable Record!

In the four months during which the fleet of special postal-planes, designed and built by the Standard Aircraft Corporation, has carried the air-mail between New York, Philadelphia and Washington more than four hundred flights have been made and only nine of these have been interrupted for any reason whatsoever. Six of the interruptions resulted in negligible delays, and the other three held up the mail for only an hour or two.

This is a record for reliability of which the best train-service would be proud.

For peace-time duty as in war-time service "STANDARD" Airplanes have proved their superiority.

Member of Manufacturers' Aircraft Association, Inc.

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ELIZABETH NEW JERSEY

NEW MOVE FOR A DEPARTMENT OF THE AIR

Its Importance Is Emphasized by Senator Chamberlain

NECESSARY FOR CONTROL

America's Future in Aviation Rests on Efficient Coordination and He Recommends a Unification of Effort

Formation of a department of the air, with its directing head a member of the Cabinet, was urged Jan. 22 by Senator Chamberlain (Ore.), chairman of the Senate Military Committee. Senator Chamberlain said that the creation of the department at this time was more important than the army or navy, because control of the air will be the decisive factor in the next war. The Senator said:

"The United States should profit by the experiences of the war with Germany and formulate a constructive programme accordingly. We ought to continue to manufacture airplanes in reasonable quantities, but more than all we should endeavor to develop mechanical flight so as to be able, should the emergency arise, to achieve and maintain control of the air.

"I do not think that this country should endeavor to keep up an air programme to the extent aimed at while we were at war, but developments in aeronautics more than in all other sciences bearing on intimate relationship to national defence is absolutely essential. Otherwise America cannot hope to attain that position of supremacy in aerial navigation which she should have attained during the war had our executive efforts been properly coordinated.

"The air problem in the future seems to rest on efficient coordination. It is for this reason that we recommend a unification of effort, and still urge such a policy. What I would like to see would be the creation of a separate air bureau or department, whose head shall sit in the Cabinet along with the Secretaries of War and Navy."

Central News Photo Service

Jules Vedrines, the French Aviator, Who Made a Landing on a Paris Roof and Who Soon Is Coming to America

---

Chile Has Aerial Mail Service

Included in the New Year's festivities in Chile was a ceremony marking the inauguration of aerial postal service between Santiago and Valparaiso.

Landing Field in Philadelphia

A central landing field for all airmen in Fairmount Park, is the plan of Mayor Smith of Philadelphia, who believes that Bustleton Field is too remote. He thinks that if the air mail service is to become a factor of great importance the park should be thrown open to the aviators. He intimates that he is going to take up the matter with the post office officials.

TO LINK PARIS AND BERLIN BY AERIAL LINES

For Use by the American Mission on Its German Visit

WILL OPERATE IN RELAYS

Data Collected Will Be Brought Back by American Army Aviators to Save Time

Linking of the American peace commission in Paris with Berlin by airline is planned in connection with the visit to Germany of an American mission which will send back reliable information as to conditions in that country for the guidance of President Wilson at the Peace Congress.

It is the intention to have American army aviators bring back by airplane data collected by the mission. This will save much time which now is lost because of the broken down train service and the delays between Paris and Berlin and unreliable wire communication.

The air courier service will be operated in relays, like the old time pony express of the plains. The first flight will be to headquarters of the Third Army at Coblenz, thence following the River Main to Beyreuth and across the Fichtel Mountains to Prague. Changing again at Prague the airplanes will fly direct to Berlin. Aerodromes and gasoline stations are now being established at Prague.

It is not believed to be possible to start an air courier daily, because the weather not always will permit this, but it is believed that an average of four days a week can be reached. A number of the foremost American army aviators have applied for assignments in this service.

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COLLEGE POINT, N. Y.

GREAT BRITAIN PRE-EMINENT IN THE AIR

In November, 1918, She Had 30,000 Officers and 264,000 Men

23,000 WOMEN IN THE R. A. F.

When Hostilities Ceased She Possessed 21,000 Airplanes, 1300 Seaplanes and 103 Airships

Great Britain was pre-eminent in the air at the close of the war, when the British Air Force was the largest in the world, according to a report made public in London. It fought on more fronts than the air service of any other nation, and its successes were proportionately greater, it is said.

In August, 1914, the British naval and military air services together numbered only 285 officers and 1853 men of other ranks. In November, 1918, there were 30,000 officers and 264,000 men. At the outbreak of the war Great Britain had 166 airplanes, forty-five seaplanes and seven airships, while at the close of hostilities she had 21,000 airplanes, 1300 seaplanes, and 103 airships. Besides this, there were 25,000 airplanes and seaplanes being built, and 55,000 airplane engines under contract.

The Women's Royal Air Force, which was not in existence in 1914, numbered at the close of hostilities 23,000.

Canada to Get U. S. Air Station

The United States naval air service station at Eastern Passage, in Halifax Harbor, is to be taken over by the Canadian naval service by the first of the year. Sixty of the 250 members of the American unit have left the station for New York.

Photo Committee on Public Information

Capt. Edward V. Rickenbacker, the Ace Who Is Being Applauded by the American Public

Fliers Can Fire Three Guns at Once

Perfection of the Browning machine gun for airplanes so that a flier can by pressing one trigger fire three machine guns simultaneously, shooting 3,000 shots a minute at the same target, was announced by the inventor, John M. Browning, at Ogden, Utah, on Dec. 19.

INTER-ALLIED AIR COUNCIL FOR PARIS

British Plans Ready for the Meeting to Be Held Soon

DIFFICULTIES TO BE MET

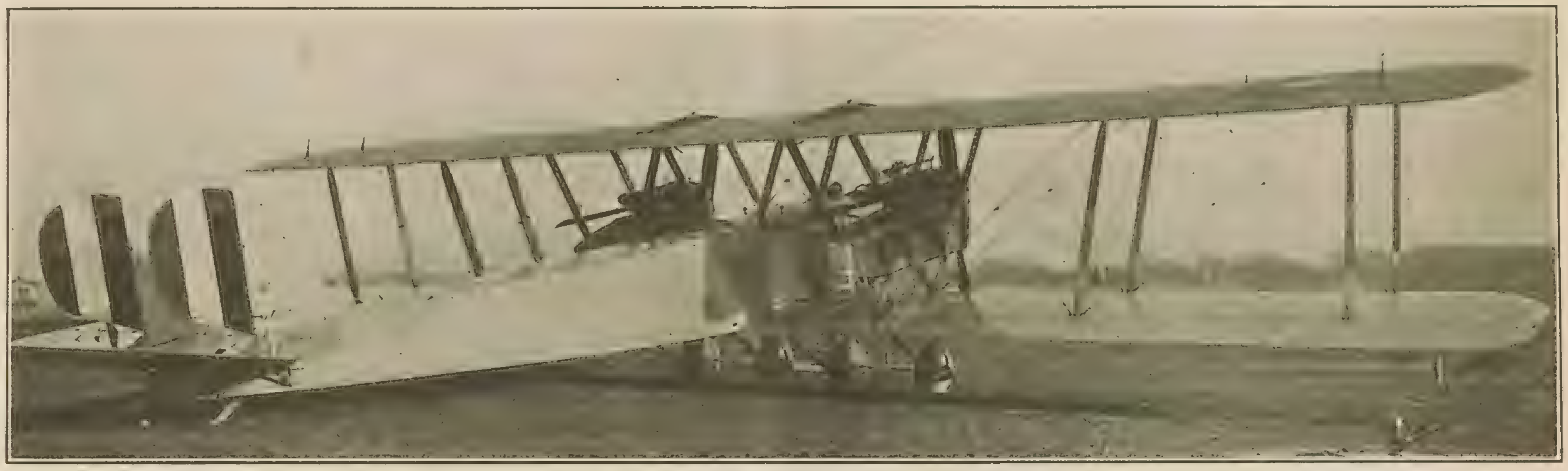
Technical Experts Now Engaged on Points to Be Submitted to the Commission for Settlement

The inter-allied air commission will meet in Paris shortly to settle the big problems connected with the aerial traffic of the world. Technical experts of the various powers now are engaged on plans to be submitted to the commission. The British scheme, acording to the Paris edition of the London *Daily Mail*, is ready.

One of the chief difficulties to be overcome is the drawing up of a set of rules for aerial passage applicable to all nations, in view of the complicated geographical conditions. Ordinary rules for flying, such as speed, height, navigation, lights and so forth, are easily adjustable, but the political and commercial aspects are bound to involve controversial points.

Boy Scouts Complimented

The Secretary of War has made public the text of a letter sent to the national president of the Boy Scouts of America, complimenting the boys for their co-operation with the War Department in locating and reporting 20,758,660 feet of black walnut timber, which was urgently needed during the war in the manufacture of propellers, etc. Secretary Baker referred to this service as "a splendid achievement."



THE MARTIN NIGHT BOMBER

THE MOST IMPORTANT AERIAL DEVELOPMENT OF THE WAR

Officially, it has surpassed the performance of every competitor.

MARTIN U.S.A.

The skill and ability of the HOUSE OF MARTIN continue to maintain Supremacy of Performance and Dependability which they have held since 1909.

THE FORERUNNER OF THE WONDERFUL

AERIAL FREIGHTER AND TWELVE-PASSENGER AIRPLANE

THE GLENN L. MARTIN COMPANY, Cleveland

Contractors to the United States Government

From the Log to the Finished PROPELLER BLADE

—we design, as well as build, propellers of Walnut.

Our engineering department will be glad to confer with airplane manufacturers.

We have been making Walnut propellers of proven performance for—

Gallaudet Aircraft Corporation, Wright-Martin Aircraft Corporation, Lewis & Vought, Standard Aircraft Corporation, Loening Aeronautic Eng. Corporation.

May we not figure with you?

HARTZELL WALNUT PROPELLER CO.
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Aeronautical Engineering and Airplane Design

By

LIEUTENANT ALEXANDER KLEMIN

Air Service, Aircraft Production, U. S. A., in Charge Aeronautical Research Department, Airplane Engineering Department. Until entering military service in the Department of Aeronautics, Massachusetts Institute of Technology, and Technical Editor of *Aviation and Aeronautical Engineering*. In two parts.

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AIRPLANING ADVANTAGES POINTED OUT

Dr. W. C. Whittemore Asks Serious Consideration for Aviation

WHAT AIRMEN WILL WANT

Demand for "The Easiest Riding Transportation Vehicle in the World" Is Predicted

In a recent issue of the *Boston News Bureau*, Dr. W. C. Whittemore, treasurer and general manager of the Whittemore-Hamm Company, of Boston, contributed the following statement:

"Have the business men of Boston given the airplane serious consideration? Probably not. During this period of business readjustment, each has found it all-important to give his own particular interests his entire time; yet during the evening's relaxation he has read of the financial condition of the trolley systems, of government control of railroads, and the regular headline subject, 'Port of Boston.' Still the airplane offers a wonderful opportunity at this time for the establishment of a great industry and should be given serious consideration. This industry will travel hand in hand with these other forms of transportation. Then why not make an air port of Boston, which will be the harbor of all cross-country fliers? Such an airplane station would act in much the same way as 'Good Roads' have helped the automobile industry, and by so doing be a stimulus to all business.

Is the Business Worth While?

"The cross-country airman will want hotel accommodations, an evening's entertainment, possibly he will see a pair of gloves or leather coat that, because of quality or design, strikes his fancy; he may break or misplace his goggles; might even develop a toothache and visit a dentist; desire to buy a present or a souvenir; possibly have a lunch put up to take out, that he may eat while he rides; and would of course need to replenish his gas and oil. Such an airplane station would encourage local manufacturing of aircraft, and thereby build an industry that employs skilled mechanics; in fact every business, either directly or indirectly, will be benefited.

"Is this business worth while? Yes. Due to the war, thousands of men have learned to fly, and sound reasoning assures us that these men will no more be content with auto travel, say at 30 to 35 miles an hour, than you were content with the bicycle after you once drove a car; and although a trip to the Cape on a bicycle was about the limit; in fact too far to be enjoyed, the auto made it a delightful after-work ride. Now the airplane makes the Cape seem like a suburb and makes even the popular resorts of the Maine Coast but a morning spin.

Advantage of Airplaning

"Airplaning is assured of success by its many advantages over other forms of travel—mainly the road—is straight and always in repair, no detours, no dust or mud, one can even fly above the cloud and avoid the rain. You leave Boston for New York, or any given point within your fuel capacity. You start your motor, open throttle wide, and away you go with no gears to shift and do not even touch your throttle again until you are ready to land. No blind curves, no bad hills, but beautiful scenery; similar to that wonderful view you had at the top of such and such a hill; in fact you can see that hilltop and miles beyond it before you even reach it.

"Think of it—you can see the Charles, the Mystic and the Neponset, and their whole surrounding wonderful country, with the Blue Hills thrown in—all at the same time!"

OUR BALLOONS ARE WATCHING ON THE RHINE

Now Floating Along the Outskirts of the German Frontier

SUMMARY OF ACTIVITIES

Several of the American Third Army Corps' Balloonists Are on Their Way to America

High up in the clouds an American army sausage balloon looked across the hills and valleys of Prussia on Jan. 20. It was the first balloon in the bridgehead area and was sent up over the fortress of Ehrenbreitstein for a test flight. While no attempt by the Germans to make a surprise attack is anticipated balloons will in a few days be floating about the outskirts of the frontier just as was the case along the battle lines in war days.

Captain C. Reis of Evansville, Ind., commander of the balloon group of the Third Army Corps, and Lieut. William H. Carthy of Little Silver, N. J., were the occupants of the first big bag to be flown. Capt. George Harris of Houston, Texas, and Captain Ira R. Koenig of St. Louis, Mo., will at once make ascents at different points in the area in other balloons. These balloons were manufactured in America. Three companies, each consisting of eight officers and 170 men, are stationed in the area. The weather is extremely cold for balloon observations from a high altitude.

A summary of the balloon activities under Colonel Frank P. Lahn of Washington shows that out of hundreds of balloons shot down by German aviators in flames, only one American casualty occurred, that of Lieutenant Lee J. Ross, near Verdun. His parachute became tangled and the bag burst into flames before he was able to release it.

When Lieutenant D. G. Boyd's balloon was pulled down in a high wind at St. Mihiel it made a nose dive within 500 feet of the ground, crushing the basket against a tree and breaking Boyd's back. In the same gale, a balloon containing Roland T. Tait of St. Louis and George W. Hinman of Boston was pulled down and the cable broke. One of the parachutes was torn off by trees and the wind carried the sausage over the German lines. The observer having the remaining parachute refused to jump alone. Lieutenant Tait, a former professional balloonist, succeeded in making a landing. Both were injured doing so, and were captured by the Germans. Several weeks later the Germans dropped a note saying that the men were well.

Several balloonists attached to the American Third Army left Coblenz Jan. 20 bound for America. Among them were Lieutenant George Carroll of Garrett, Ind., who was slightly wounded when his basket was riddled by bullets two hours before the fighting stopped; Lieutenant D. M. Reeves of Atlanta, Ga., who jumped three times in four hours, and twice from burning balloons; Lieutenant Leo C. Ferrenback of St. Louis, who received the Distinguisheed Service Cross for jumping four times and reascending every time; Captain Burge M. Clark of Leland Stanford University, and Lieutenant George R. Durkee of Omaha, Neb.

Gives Airplane to New York City College

The Italian Military Mission on Aeronautics, recently gave to the engineering department of the City College of New York a Pomilio airplane and a complete eight-cylinder Isotta Franschini airplane motor. The airplane had been in active service along the Piave front. The presentation was made by Dr. Arbib-Costa.

Thomas

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ASSEMBLING WAR RELICS IN WASHINGTON

Material Relating to the Conflict for the U. S. National Museum

VARIOUS CLASSIFICATIONS

The Collection Closely Parallels What Is Now Being Installed by the British War Museum

The U. S. National Museum is now assembling and has recently begun the installation of a collection of material relating to the present war which will form one of the most important ever shown in the Museum. The object of the collection is to preserve and exhibit for the benefit of the public a series of objects graphically illustrating the military and naval activities of all of the countries engaged in the war—the United States, its Allies, and the enemy—and will, in addition to the military and naval features, include foods and other economic specimens. The immense value of such a museum collection when once assembled cannot be over-estimated either from the popular or scientific point of view. It will not only form a fitting and serviceable supplement to the written and printed records relating to the history of the war, but it will also constitute a most notable memorial to the patriotic forces represented by the individuals who have contributed to the preservation of civilization and democracy in the present great crisis.

Central News Photo Service

The C-1, America's Largest Dirigible, Taken as It Passed Over the Bathing Beach at Miami on Its Way from Far Rockaway, N. Y., to Key West, Fla.

The collection will consist principally of the following general classes of material, but will be expanded to cover others also:

Military and naval decorations and medals, including types of military decorations, medals, and badges awarded to officers and enlisted men of the Army and Navy for service prior to and during the progress of the conflict.

Commemorative medals, including all medals commemorating notable events during the progress of the war, and other numismatic material issued during the war, including medallic souvenirs of all kinds.

Military and naval service insignia, including all types of devices and designs showing the different ranks and branches of the service.

Individual military and naval equipment, including the equipment of the individual enlisted man of the various branches of the service, such as clothing, arms, and other paraphernalia.

General military equipment, including tank, field, and machine guns, and other objects employed or used by the military squads and organizations rather than by individual soldiers.

Air Service equipment, including airplanes and other accessories of this most important branch of the military war activities.

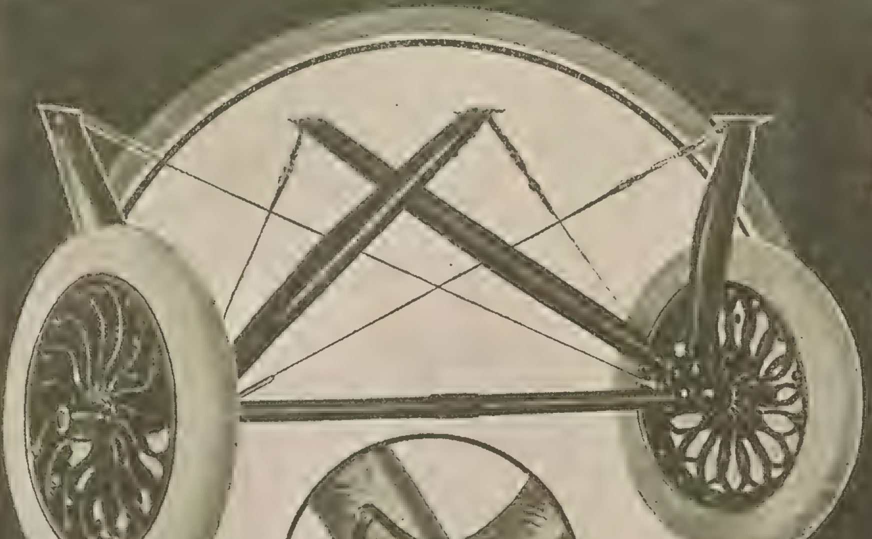
General naval equipment, including models of ships, naval guns, and types of other war paraphernalia employed by the Navy in the prosecution of hostilities.

Mementos of persons, including relics of noted individuals serving with the Army or the Navy or, otherwise identified with the war activities.

Pictures, maps, books, pamphlets, manuscripts and other objects of the same character relating to the progress of the war.

The material noted parallels closely in character what is now being assembled by the British Imperial War Museum, which has been recently established to preserve museum material relating to the present war. The initial installation of the National Museum's war collection has been made in the Arts and Industries building of the Museum amid dignified and appropriate surroundings, with an adequate allowance of space and in suitable cases.

The Museum has secured the cordial cooperation of the War and Navy Departments, which are furnishing most interesting exhibits of equipment and paraphernalia at present used in the Army and Navy. The War Department further has undertaken to assist the Museum in securing material from abroad relating to the enemy countries.



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ACTIVITIES OF THE BUREAU OF STANDARDS

Recent Expansion on Lines Vital to the Success of the War

SAYS DR. S. W. STRATTON

Free Flights to Furnish Data for Study of the Theory on Which Airplanes Are Designed

For the work of the Bureau of Standards during the fiscal year, 1919-1920, estimates for appropriations have been submitted to Congress, according to the last annual report of the Secretary of Commerce, of $2,098,760, which is an increase over those of the preceding year of $263,100. It is explained that this increase is due to the largely increased activities of the Bureau, and especially in connection with the war work of the Government. No request is made for aircraft production, for which $60,000 was appropriated for the current year, or for military research, for which the last appropriation was $250,000.

Activities of the Bureau

As to the activities of the Bureau, the report says:

"Owing to the rapid expansion of the Bureau's work in metals upon our entrance in the war and the critical importance of metallurgy in its many military applications, an allotment was made by you on Aug. 30, 1917, from the fund for national security and defense of $250,000 for the erection of a laboratory for standardization of metals, appliances, and instruments for military purposes. This building is in use. It provides suitable housing for other lines of military standardization.

"The radio laboratory, for which a special appropriation of $90,000 was provided by Congress, is completed and occupied by the Bureau and the representatives of the War and Navy Departments. It gives increased facilities for radio work, although, owing to the rapid expansion of this work since the war began, the building is not now large enough. It may be necessary to continue some radio work in another building.

"The erection of an airplane-engine research laboratory for the Bureau of Standards will be commenced in the near future. The importance of the airplane program and the fact that the Bureau has long been continuously studying the underlying scientific principles involved in aircraft design and improvement for both Army and Navy made it necessary to provide suitably equipped housing for researches on airplane motors. This building will house four dynamometers, the refrigeration plant, two altitude laboratories, and the necessary equipment for running altitude tests of airplane engines. In this laboratory studies of airplane engines may be made under conditions which simulate high altitudes as to air pressure, air movement, and temperature, for altitudes near the surface and up to as high as 40,000 ft. These researches are enabling the Bureau to furnish the aviation services of both Army and Navy with new and reliable data for improving the efficiency of operation and control of airplane engines."

The character of this work is detailed in a contribution to the report by Dr. S. W. Stratton, Director of the Bureau. Dr. Stratton says in part:

What Dr. Stratton Says

"In anticipation of demands the Bureau before the war had begun special researches known to be required. The urgency of many of these problems was not realized even by those in close touch with the situation. The absolute cutting off of the optical-glass supply, the failure of the linen supply, the total lack of ship chronometers, and the necessary uses of light alloys are examples. The rapidity with which the military researches were prosecuted is gratifying, as is the fine spirit of cooperation exhibited. The one thought has been the fullest aid where science could help win the war. The expansion of the Bureau to meet the new demands engaged the most serious attention of the staff, and men and facilities were freely furnished for military work. Practically every section of the Bureau's regular organization has had military problems of the most pressing nature submitted to it, and invaluable service has been rendered.

"The recent expansion of the Bureau has been on lines vital to the success of the war. It is interesting to note, however, that many of these lines are of essential value to our industries in peace. The need for the national provision for master-gauge standardization was only realized by those in close touch with such work. The establishment of a gauge-standardization laboratorw has proven an important aid to the mechanical industries. The accurate dimensioning of the functioning parts of mechanisms will permit extending the American system of manufacturing interchangeable parts to its maximum usefulness. The importance of nationwide standardization has long been known, but the practical working out of such standardization is best met by a national laboratory such as the Bureau of Standards. The same principle holds for all the technologies and special branches of physics. The researches now being conducted for war purposes will prove of inestimable permanent value for the general welfare.

"The combination of pure science and technology has proven especially stimulating and effective. The close cooperation of physicists and engineers in practical as well as theoretical work has given an unusual breadth to such researches. In turn, the technologic facilities have proven of great value in the purely scientific work. Many cases might be cited where the elements of a research problem ramify into laboratories of practically every division of the Bureau. The airplane is an example, and a problem apparently as simple as the spark plug has called for experiments in many different sections of the Bureau. The establishment of new industries in America, such as those of optical glass and chemical porcelain, and the scientific remodeling of older industries are fruits of the more intimate cooperation of science and industry which it is the function of the Bureau to perfect.

Aeronautical Research

"During the year scientific problems in nearly all branches of aeronautics have been investigated by the Bureau, comprising material, design, power sources, and technical data. The work is being done in cooperation with the National Advisory Committee for Aeronautics and the military departments of the Government. The primary researches include the development of systems of laboratory tests of all details of airplane design, such as materials, construction, efficiency of form, motor performance, the efficiency of lubrication, carburetion, ignition, choice of fuel, propeller and plane performance, measuring instruments, and the appliances and physical constants required throughout for control. These and other pertinent airplane investigations were taken up in the laboratories of the Bureau under closely simulated service conditions, embracing such factors as air pressure and air movement, temperature, vibration, humidity, etc.

"The engineering testing and investigation covered airplane parts, the use of spruce in air plane construction and mahogany for propellers, the development of instruments for measuring the tension in airplane cables, study of shock-absorbing wheels for airplanes and seaplanes, and many others.

"A unique feature of the airplane-research program now under way is the development, in connection with the National Advisory Committee for Aeronautics, of a system of free-flight tests made in normal flying as actually practiced by Army aviators. Here the problem is to develop a series of autographic instruments, which during free flight will furnish the primary data for a scientific study of the theory on which airplanes are designed. The six autographic instruments have been designed at the laboratories of the Bureau of Standards, and three have been completed. These will furnish, without any attention from the aviator, a continuous graphic time record during the entire period of flight, showing the engine torque, revolutions per minute, propeller thrust, plane speed, angle of attack, and inclination with horizon.

The epoch-making advance of all phases of aeronautics during the great war has caused experts to realize the strategic importance of perfect control of aircraft with speed and precision. The mastery of the air depends upon such control, which in turn depends upon a whole battery of measuring instruments for indicating position, direction, speed, temperatures, pressures, etc.

The Bureau's aeronautical-instrument laboratory had done fundamental work on the theory of the altimeter and had been testing such instruments for several years before the war began. The staff was promptly increased and now consists of about thirty-five men. The work of this section is to discover sources of error or improvement in the instruments on which aviators depend for aerial navigation, scouting, fighting, and bombing, and to develop standard testing methods. In one instance, the Bureau's tests caused the rejection of 5000 altimeters.

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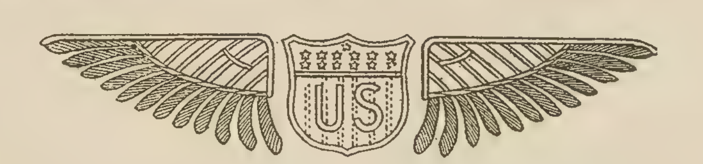

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DISTINGUISHED SERVICE CROSS

First Lieut. Philip H. Williamson

First Lieut. Philip H. Williamson, 1st Anti Aircraft Machine Gun Battalion. For extraordinary heroism in action near Thiaucourt, France, Sept. 10-26, 1918. Displayed extreme coolness and courage while conducting the advance of his company in the sector near Thiaucourt. Visited daily, under heavy shell fire, his gun positions and made daily reconnaissances of the lines. When wounded he refused to be taken to the hospital until he had superintended the removal of his men to a place of safety. Home address, Mrs. F. A. Williamson, mother, Roland Park, Baltimore, Md.

First Lieut. Ralph P. Bagby, Observer, F. A.

First Lieut. Ralph P. Bagby, Field Artillery, observer, 88th Aero Squadron. For extraordinary heroism in action near Tailley, France, Nov. 2, 1918. Lieutenant Bagby and First Lieut. Louis G. Bernheimer, pilot, on their own initiative went on a reconnaissance mission, flying thirty kilometers behind the German lines, securing valuable information as to the condition of the bridges across the Meuse River and enemy activity in the back areas and also harassing enemy troops. Home address, R. J. Bagby, father, New Haven, Mo.

Second Lieut. Guy E. Morse

Second Lieut. Guy E. Morse (deceased), observer 135th Aero Squadron. For extraordinary heroism in action near Vilcey-sur-Trey, France, Sept. 12, 1918. Lieut. Morse, with First Lieut. Wilbur C. Suiter, pilot, fearlessly volunteered for the perilous mission of locating the enemy's advance unit in the rear of the Hindenburg line. Disregarding the hail of machine-gun fire and bursting of anti-aircraft shells, they invaded the enemy's territory at low altitude and accomplished their mission, securing for our staff information of the greatest importance. These two gallant officers at once returned to the lines and undertook another reconnaissance imssion, from which they failed to return. Lieutenant Morse's body was found and buried by an artillery unit. Next of kin, Ernest Morse (father), 4328 Harrison Street, Kansas City, Mo.

Second Lieut. Frank Luke, Jr.

Second Lieut. Frank Luke, Jr., deceased, 27th Aero Squadron, Air Service. For extraordinary heroism in action near St. Mihiel, France, Sept. 12 to 15, 1918. Lieutenant Luke, by skill, determination, and bravery, and in the face of heavy enemy fire, successfully destroyed eight enemy observation balloons in four days. Next of kin, Frank Luke (father), 2200 West Monroe Street, Phoenix, Ariz.

First Lieut. John H. Snyder, Observer, A. S.

First Lieut. John H. Snyder, observer, Air Service, 1st Army. For extraordinary heroism in action Sept. 12, 1918. While on a special mission to determine the probable enemy concentration in the back areas, Lieutenant Snyder, with his pilot, in spite of almost impossible flying conditions, flew sixty kilometers over the enemy lines at a very low altitude. The unfavorable weather alone would have warranted them in turning back, but they continued on regardless of very active and accurate machine gun and anti-aircraft fire. They returned to our lines only when their mission was successfully completed. Home address, Mrs. William H. Noll, 319 North Sixth Street, Reading, Pa.

First Lieut. William Rucker, A. S.

Edward William Rucker, first lieutenant, 27th Aero Squadron, Signal Corps. Outnumbered and handicapped by his presence far behind the German lines, he and three flying companions fought brilliantly a large group of enemy planes, bringing down or putting to flight all in the attacking party, while performing an important mission near Luneville, France, on June 13, 1918.

Second Lieut. John MacArthur, A. S.

John MacArthur, second lieutenant, 27th Aero Squadron, Signal Corps. Outnumbered and handicapped by his presence far behind the German lines, he and three flying companions fought brilliantly a large group of enemy planes, bringing down or putting to flight all in the attacking party, while performing an important mission near Luneville, France, on June 13, 1918.

Second Lieut. Fred A. Tillman, A. S.

Fred A. Tillman, second lieutenant, Aviation Section, Signal Corps. He aroused the admiration of all the French first-line infantrymen when making an infantry liaison west of Rheims, France, June 26, 1918. He flew over the enemy lines at an altitude of only 150 meters, in spite of violent machine-gun and anti-aircraft fire. Shot down between the lines, with his plane riddled with bullets and his pilot severely wounded, he picked up his pilot in his arms and carried him through heavy fire more than 200 meters to the French first lines, after he himself was wounded in the neck.

Influenza Epidemic Results

A summary of the results of the influenza epidemic in the Army camps and military centers in the United States shows that a total of 338,257 cases of the disease were recorded with approximately 17,000 deaths.

Since Sept. 13, the date of the outbreak, to Dec. 1, 19,694 deaths from all causes were reported from military stations in the United States. It is estimated that approximately 2,000 of these were due to causes other than influenza and pneumonia.

First Lieut. J. A. Higgs, A. S.

First Lieut. J. A. Higgs, Air Service. For repeated acts of extraordinary heroism in action near Pont-a-Mousson, France, July 31 and Aug. 21, 1918, near Gesnes, France, Oct. 29, 1918. On July 31, near Pont-a-Mousson, Lieutenant Higgs was carrying on a general surveillance of his sector from his balloon with a French soldier, when an enemy plane dived from a cloud and opened fire on the balloon. In imminent danger he remained in basket until he had helped his French comrade, after whom he himself jumped. On Aug. 21, in the same sector, Lieutenant Higgs was performing an important mission regulating artillery fire. Enemy planes attacked, and with great gallantry Lieutenant Higgs remained in the basket until his assistant had jumped. On Oct. 29, near Gesnes, Lieutenant Higgs was conducting a reglage from the basket with a student observer. Attacked by enemy planes, after his balloon was burning, Lieutenant Higgs would not quit his post until he had assisted his companion to escape. In each of the foregoing instances, Lieutenant Higgs at once reascended in a new balloon. Home address, Mrs. James A. Higgs, wife, Lathrop, Ala.

First Lieut. Robert P. Elliott, Pilot, A. S.

First Lieut. Robert P. Elliott, Air Service, pilot, 96th Aero Squadron. For extraordinary heroism in action near Olizy, France, Oct. 27, 1918. Lieutenant Elliott flew in a formation over the enemy's lines on a bombing expedition. Attacked by a greatly superior number

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of enemy pursuit planes, his aileron controls soon shot away, Lieutenant Elliott continued to pilot his machine and give protection to his comrades. When his observer was seriously wounded, Lieutenant Elliott left the formation at great risk to himself, and with a disabled machine made a safe landing. Home address, J. M. Elliott, father, First National Bank, Los Angeles, Cal.

First Lieut. Elmer Pendell, Observer

First Lieut. Elmer Pendell, 120th Infantry, observer, 168th Aero Squadron. For extraordinary heroism in action Nov. 4, 1918. As observer in D. H. 4 plane, Lieutenant Pendell flew an Infantry contact machine over the line of the 7th Division Nov. 4, 1918. Because of exceedingly adverse weather conditions, Lieutenant Pendell disregarded the danger of fire from the ground and crossed the lines at 1,000 feet altitude. While thus flying he was wounded in the shoulder by an explosive bullet fired from the ground. Disregarding his wound, he came down to an altitude as low as 500 feet. After securing the desired information he wrote out his message with great effort and dropped it to the division. Home address, George C. Pendell, father, Caribou, Me.

First Lieut. Rodney M. Armstrong, Pilot, A. S.

First Lieut. Rodney M. Armstrong, Air Service, pilot, 168th Aero Squadron. For extraordinary heroism in action Nov. 4, 1918. As pilot of a D. H. 4 plane, Lieutenant Armstrong flew an Infantry contact machine over the lines of the 7th Division Nov. 4, 1918. Owing to low clouds and rain, he crossed the line at 1,000 feet in order to enable his observer to locate the position more accurately. While on the enemy's side, he was wounded by an explosive bullet. In spite of his wound and weakness, he continued his mission, coming down to within 500 feet of the enemy's machine guns and troops, until his observer had signaled him that the mission was completed. Home address, Mrs. R. M. Armstrong, wife, 1012 East Eleventh Street, Winfield, Kans.

First Lieut. James F. Manning, Jr., Pilot, A. S.

First Lieut. James F. Manning, Jr., Air Service, pilot, 49th Aero Squadron. For extraordinary heroism in action near Doulcon, France, Oct. 4, 1918. While leading a patrol of seven planes, Lieutenant Manning accepted combat with seventeen German machines (type Fokker) at an altitude of 1,200 meters. Through his courageous leadership and skillful maneuver of his patrol, seven of the enemy planes were shot down. Home address, J. F. Manning, father, Leesburg, Va.

First Lieut. Field E. Kindley, A. S.

First Lieut. Field E. Kindley, Air Service. For extraordinary heroism in action near Bourlon Wood, France, Sept. 24, 1918. Lieutenant Kindley attacked formation of seven hostile planes (type Fokker) and sent one crashing to the ground.

BRONZE OAK LEAF

A bronze oak leaf is awarded to Lieutenant Kindley for the following act of extraordinary heroism in action near Marcoing, France, Sept. 27, 1918. Flying at a low altitude, this officer bombed the railway at Marcoing and drove down an enemy balloon. He then attacked German troops at a low altitude and silenced a hostile machine gun, after which he shot down in flames an enemy plane (type Halberstadt) which had attacked him. Lieutenant Kindley has so far destroyed seven enemy aircraft and driven down three out of control. Home address, Utzer Kindley, cousin, care Bank of Gravette, Ark.

Second Lieut. Kenneth L. Porter, A. S.

Second Lieut. Kenneth L. Porter, Air Service, 147th Aero Squadron. For extraordinary heroism in action near Chateau-Thierry, France, July 2, 1918. Lieutenant Porter, with four other pilots attacked twelve enemy aircraft (type Pfalz), flying in two groups well within the enemy lines. As soon as the enemy planes were sighted, Lieutenant Porter maneuvered to get between them and the sun and with great difficulty gained the advantage. While three of the other American officers dived on the lower formation Lieutenant Porter and Second Lieutenant John H. Stevens engaged the upper formation in a bold and brilliant combat, two planes of which they crashed to the earth. Home address, Mrs. Harriet Porter, mother, 105 Green Street, Dowagiac, Mich.

Second Lieut. John H. Stevens, A. S.

Second Lieut. John H. Stevens, deceased, Air Service, 147th Aero Squadron. For extraordinary heroism in action near Chateau-Thierry, France, July 2, 1918. Lieutenant Stevens, with four other pilots, attacked twelve enemy aircraft (type Pfalz) flying in two groups well within the enemy lines. As soon as the enemy planes were sighted Lieutenant Stevens maneuvered to get between them and the sun, and with great difficulty gained the advantage. While three of the other American officers dived on the lower formation Lieutenant Stevens and Second Lieut. Kenneth L. Porter engaged the upper formation in a bold and brilliant combat, two planes of which they crashed to the earth. Home address, Mrs. Effie Stevens, 21 State Street, Albion, N. Y.

Capt. Victor H. Strahm, Pilot, A. S.

Capt. Victor H. Strahm, Air Service, pilot, 91st Aero Squadron. For extraordinary heroism in action near Metz, France, Sept. 13, 1918. Captain Strahm displayed remarkable courage and skill in penetrating the enemy territory for a distance of twenty-five kilometers, flying at an altitude of less than 300 meters. His plane was subjected to intense fire from anti-aircraft guns in the region of Metz, and he was attacked by a superior number of German planes, one of which he destroyed. He completed his mission and returned with information of great military value. Home address, Frank J. Strahm, Bowling Green, Ky.

Second Lieut. William J. Brotherton, A. S.

Second Lieut. William J. Brotherton, Air Service, 147th Aero Squadron. For extraordinary heroism in action near Fere-En-Tardonois, France, on Aug. 1, 1918. An enemy Rumpler plane being reported over the airdrome, Lieutenant Brotherton, with another officer, ascended and soon encountered six Fokker planes that were protecting another Fokker serving as a decoy. Disregarding the enemy's superiority in numbers, he maneuvered so as to secure the advantage of the sun and dived on the decoy plane; pouring in a destructive fire, he killed the pilot and crashed the machine to the ground. Home address, C. J. Brotherton, Guthrie, Ill.

First Lieut. Lansing C. Holden, A. S.

First Lieut. Lansing C. Holden, Air Service, 1st Pursuit Group. For extraordinary heroism in action near Montigny, France, Oct. 23, 1918. Lieutenant Holden was ordered to attack several German balloons, reported to be regulating effective artillery fire on our troops. After driving off an enemy plane, encountered before reaching the balloons, he soon came upon five balloons in ascension one kilometer apart. In attacking the first, which proved to be a decoy with a basket, his guns jammed; after clearing them he attacked the second balloon, forcing the observer to jump. His guns again jammed before he could set fire to this balloon. Moving on the third balloon at a height of only fifty meters, he set fire to it and compelled the observer to jump. He was prevented from attacking the two remaining balloons by the further jamming of his machine guns. Home address, L. C. Holden, father, 888 West End Avenue, New York, N. Y.

That the services of the United Aircraft Engineering Corporation may be of the greatest possible value to the upbuilding of the industry this firm is rapidly adding to its organization personnel those names which are best known for definite aircraft engineering accomplishment.

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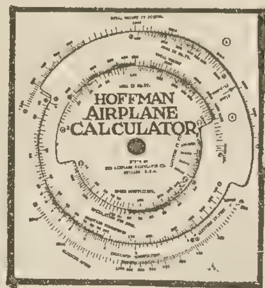
New York



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Personals

The engagement has been announced of Florello H. La Guardia, a Major in the U. S. Air Service, who was re-elected Representative to Congress last Autumn from the Fourteenth District of New York, to Miss Thea Almerigotti of 163 Lexington Avenue, a native of Trieste, who has made her home in New York for seven years. The marriage will take place at an early date.

Col. Henry C. Pratt is now in command of Kelly Field. He is well known in the Air Service as the developer in this country of the Gosport system of aerial instruction. Colonel Pratt altered to meet American conditions the original idea as employed at Gosport, England, by Colonel Smith-Barry of the British Army.

Major Charles T. Waring, A. S. A., succeeds Lieut. Col. H. C. K. Muhlenberg as Commanding Officer of the Wilbur Wright Air Service depot.

Major A. B. Lambert has been detailed as officer in charge of free ballooning at Camp John Wise, Texas.

Col. C. G. Edgar is planning to leave the Air Service in February and resume direction of his sugar business in Detroit.

Major Henry Rodgers succeeds Major George W. Krapf as executive officer at Camp John Wise, Texas.

Colonel Deeds Is Much Gratified

Colonel Deeds, at Dayton, Ohio, on Jan. 16, gave out this statement, after receipt of the news from Washington as to his exoneration

"I am naturally very much gratified by the information that is given out from the office of the Secretary of War. There has been no doubt in my mind, once the facts were really known, that everything would turn out all right.

"We have all passed through stirring, oppressive, strenuous times as Americans, and we have all tried to do our share in bringing ultimate triumph to our arms. No man needs special commendation for doing the right thing. It was expected that patriotic Americans would do this. We have worked together to win the great war, and I personally hope, along with all my fellow-citizens, that there may be that same spirit of consideration and co-operation among us to win the battle of peace, which is our next national task.

"It has been a privilege and a pleasure to know that during the days of the immediate past, friends who knew us best have known of our sincere efforts. A memory of fruitful days spent in the service of such a wonderful country as America is sufficient reward for me. I could ask nothing better for my share in this successful enterprise than that those who wished to know the truth, now have it, officially from the Secretary of War."

Rated as Reserve Military Aviators

The following named officers were rated as Reserve Military Aviators, between Dec. 3, 1918, and Jan. 10, 1919: Major Charles Herrick Hammond, A. S. A.; Capt. L. E. McQuitty, A. S. A.; Capt. Raymond Wilcox Smith, A. S. A.; Capt. Brady Walter Warner, A. S. A.; First Lieuts. Paul Royal Corner, A. S. A.; Harry Walker Colmery, A. S. A.; Forrest Smith Emery, A. S. A.; Joseph S. Pliska, A. S. A.; Eben Stanley, A. S. A.; Albert Hector Torongo, A. S. A., and A. W. Vanaman, A. S. A.; Second Lieuts. Clyde M. Allen, A. S. A.; Charles Clark Bowen, A. S. A.; Otto F. Burney, A. S. A.; John S. Childs, A. S. A.; C. F. Cocke, A. S. A.; Elmer Fred Degon, A. S. A.; Wallis A. Frederick, A. S. (M. A.); Taylor Nathan House, A. S. A.; John Prescott Hoyt, A. S. A.; Ellis A. Noland, Jr., A. S. (M. A.); Mark H. Redman, A. S. A.; Watkins Wendell Reynolds, A. S. A., and Frederick H. Winston, A. S. (M. A.); Capt. R. S. Porter, A. S. A.; Capt. R. H. Torrey, A. S. A.; Capt. Frank F. Bell, A. S. A.; First Lieuts. Harmar D. Denny, Jr., A. S. A.; Second Lieuts. John C. Bennett, A. S. A.; J. F. Dworschak, A. S. A.; H. A. Gulley, A. S. A., and George K. Rice, A. S. A.

A. S. Officers From Overseas Assigned

Since our last report, twelve officers from service overseas have reported to the Division of Military Aeronautics for detail to duty at the Washington headquarters or in the field. Their names follow: Major Charles S. Jackson; Capt. Garland W. Powell; First Lieuts. George W. Puryear, Otis H. Williamson, Paul F. Slocum, James A. Higgs, Jr., Byron T. Burt, Jr., George C. Whiting, Everett R. Likens, and A. J. P. Gallagher; Second Lieuts. Wayland W. Williams and Walter G. Nagle.

Aviation Officers Discharged

Orders authorizing the discharge of 132 aviators and ground officers attached to Rockwell, Ream and East fields, have been received.

One of those to leave the service is Lieut. William Wellman of Boston, American ace in the Lafayette Escadrille.

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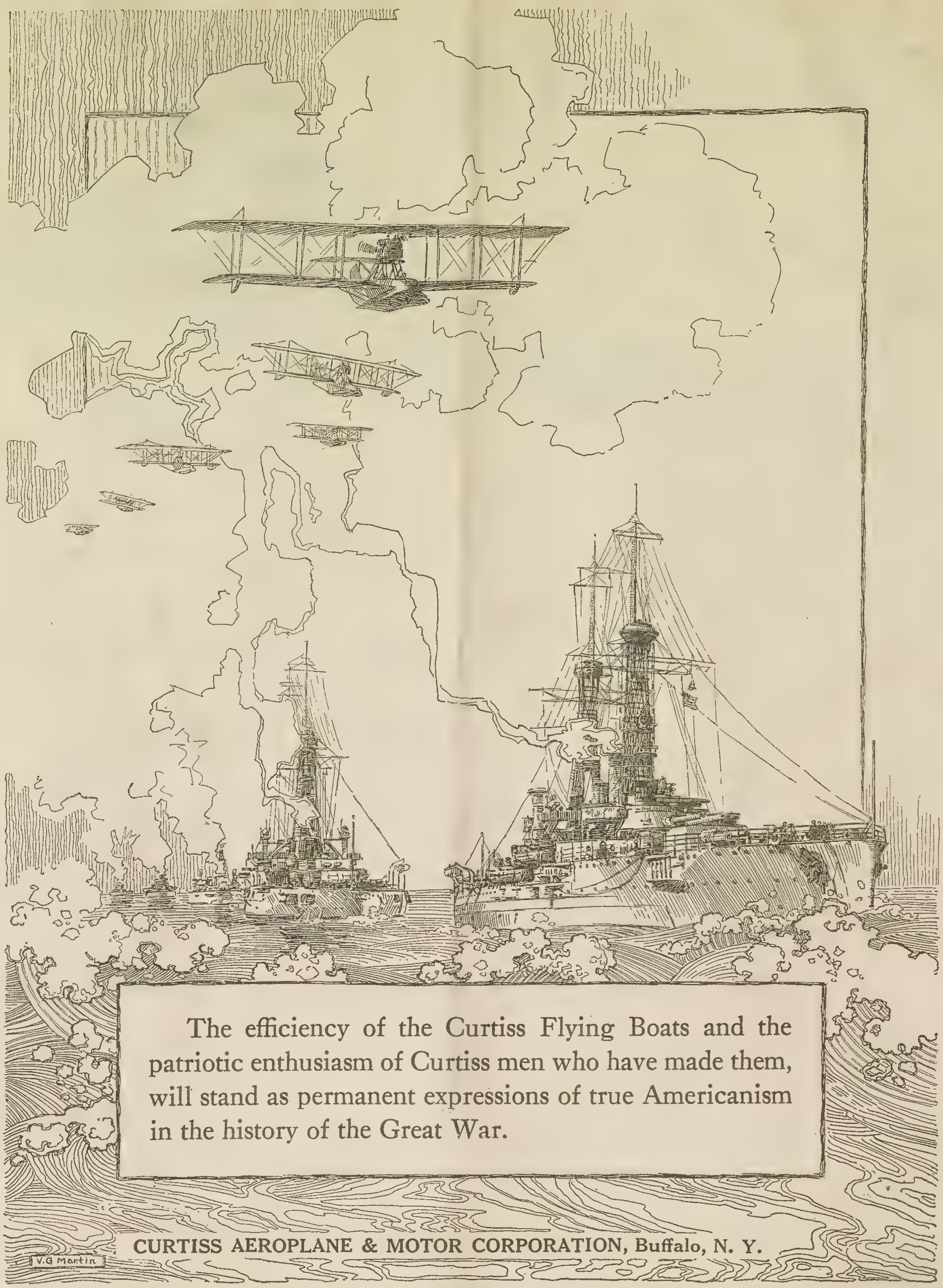

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AIR SERVICE JOURNAL

The National Aeronautic Newspaper

VOL. IV. No. 6 NEW YORK, FEBRUARY 8, 1919 PRICE 10 CENTS

BIG BUSINESS ENTERING AVIATION

Canadian Airplanes and Material Worth $10,000,000 Bought

ROY U. CONGER'S COIN WON

United Aircraft Engineering Corp. to Develop Commercial Aviation on a Large Scale

The first important step in the development of commercial aeronautics on the American continent was taken when interests headed by Roy U. Conger and associated with the United Aircraft Engineering Corp., 52 Vanderbilt avenue, New York City, of which F. G. Diffin is president, bought outright from the British Government airplanes, engines and spare parts in Canada valued at $10,000,000. While the deal was closed nearly three weeks ago, the first announcement of the news was made by the New York *Sun* Jan. 30. The price paid was not revealed.

Material Purchased

Included in the material purchased are 350 Curtiss JN4D airplanes (the type on which military flyers here and in the Dominion were trained), 1000 Curtiss engines of the 0X-90 hp. type, hundreds of propellers, wings and fuselages, and thousands of spare parts. It will require months, however, to compile a complete inventory. In conjunction with the Curtisses, it is intended to use a new monoplane, the Stout, an invention of William B. Stout, of Dayton, Ohio, which the United Aircraft Engineering Corporation is developing. This machine is being built in two types, a weight carrier and a single seater.

Mr. Conger, who is connected with the Erie Specialty Co., of Erie, Pa., and is a nephew of Edwin H. Conger, United States Minister to China during the Boxer troubles, has been granted the use of Leaside Field, near Toronto, for six months to assemble the purchase.

Wholly a Commercial Enterprise

"We bought this property for the purpose of going into commercial aeronautics," said Mr. Diffin to an AIR SERVICE JOURNAL reporter. "We are convinced that there is money in the enterprise. The first thing we have to do—and are doing it now—is to assemble our property, which at present is scattered about six flying fields. We are having it all brought together at Leaside, a suburb of Toronto, where our headquarters will be. We have appointed a general manager, F. G. Ericson, who formerly was chief engineer for Canadian Airplanes, Ltd., which is owned by the Imperial Munitions Board of the British Government.

"Next we shall establish and operate lines throughout Canada for the purpose of ascertaining exact costs of operation. We want to know precisely what it costs to transport in the air one person, one pound of goods or one small letter one mile, one hundred miles or one thousand miles. When we shall have finished our tests and analyzed our data we will be in a position to talk about service to individuals, firms or the Canadian Government — and we are going about it quickly.

"Meantime, one of the considerations which induced the British Government to sell the material to us was a moral understanding that all machines under our contral shall be piloted by responsible flyers. There are no restrictions on flying in Canada, but probably the worst thing that could happen to commercial aviation at this juncture would be to place machines in the hands of unskilled or incompetent aviators.

"Of course, now that the war is over, there wil be no difficulty in securing the highest grade of both airplane pilots and mechanicians."

Machines at Low Prices

In an interview at Toronto given by F. G. Ericson, who now becomes the Canadian representative of the United Aircraft Engineering Corp., he said he hopes to find a ready market for his wares. He says he will have the flying machines overhauled and will sell them in a few months at a price lower than is generally paid for an automobile; for somewhere in the neighborhood of $2000. Mr. Ericson is an aeronautical engineer and is not only a flier himself, but has completed various inventions connected with flying machines.

The announcement is made by Canadian officials that the deal will not accelerate demobilization of the Royal Air Forces in Canada, nor will it interfere with the plans of the Dominion Government for the establishment of a Canadian air service for naval and military purposes. Camps Mohawk and Rathbun, at Deseronto, and the Beamsville camp are to be dismantled as soon as their machines and parts and tools can be concentrated at Leaside, which, for aviation purposes, includes Armour Heights.

Deal Turned on Flip of Coin

The big deal has been pending for some time. As soon as the war ended the British Government let it be known that it was willing to dispose of the Canadian air equipment, as the property would deteriorate rapidly through nonuse. A Canadian syndicate offered $400,000 for the lot, but this offer was rejected when it was learned that the syndicate intended to offer the material at public auction, as it was feared that many of the machines would fall into the hands of incompetent and reckless persons and that injuries and deaths, out of which would grow innumerable damage suits and other distressing features, would result.

When Mr. Conger heard that the material was to be offered for sale he went to Toronto and had a talk with Mr. Morrow, acting for the British Ministry of Munitions. The offer that he made was not entirely satisfactory to the seller, but it is reported that with characteristic American daring it was agreed to hinge the deal on the flip of a coin, which fell heads up, and thus brought about the acceptance of Mr. Conger's offer.

Capt. Edward Victor Rickenbacker Dined at the Waldorf-Astoria by a Host of Admirers

(C) *Western Newspaper Union*

The Three Great American Aces

The three American aces—Edward V. Rickenbacker (middle), and sitting left to right, Lieut. P. F. Baer and Capt. Douglas Campbell—have been given the greatest honor that officers can receive, and to them will always be given credit for the most brilliant of U. S. airmen's achievements. At a time when American aviators were not considered worthy of the best French machines, they flew what they could get and started their careers with the handicaps which were later overcome by their downing Hun machines and showing that they were unsurpassed by any flyers in any service.

Platinum Wings Inlaid with Diamonds and Sapphires

FOR THE ACE'S MOTHER

Secretary Baker, General Menoher, Dr. Henry van Dyke and Bourke Cockran Among the Speakers

The climax at the dinner given by the Contest Committee of the American Automobile Association last Tuesday evening to Capt. Edward Victor Rickenbacker, A. S., came when Dr. Henry van Dyke of Princeton, dressed in the uniform of a lieutenant commander of the Navy, presented a set of platinium wings inlaid with diamonds and sapphires to the guest of the evening.

The scene was full of human interest. Seated in the center of the west side of the first balcony in the Astor Galleries of Hotel Waldorf-Astoria were Mrs. Elizabeth Rickenbacker, the mother, and Miss Anna, the sister of the valiant American Ace, while on the floor were 700 diners, all men of note in the automobile and aeronautical circles. In the balconies also were a sufficiently large number of ladies to warrant Dr. van Dyke's asertion that not only is Captain Rickenbacker an Ace of the Air but also he is the "Ace of Hearts."

Cheers for Mother and Son

When Dr. van Dyke finished Capt. Rickenbacker, who, as well as his mother, had shown much emotion during the address of the noted Princeton rhetorician, arose and said: "I thank you all," throwing a kiss toward his mother and sister. Then followed a roar of cheers.

There were five speakers: Major Gen. Charles T. Menoher, at the head of the Air Service; Secretary of War Newton D. Baker; Dr. Henry van Dyke; Capt. Rickenbacker and the Hon. W. Bourke Cockran.

Congressman Clifford Ireland of Ohio, a member of the Contest Board and an old friend of Rickenbacker's, was the toastmaster.

A message from Gen. Pershing, whose chauffeur Rickenbacker was when he first went to France, was read by Representative Ireland, as were messages from William Howard Taft, Gen. Wm. L. Kenly and others.

General Menoher's Tribute

Gen. Menoher gave an interesting narrative of his experience at the front; glorified the doughboy and concluded by saying: "The man who fights in the air, who takes his life in his hands every time he leaves the ground, is deserving of the highest praise we can bestow upon him, and no aviator is deserving of higher praise than this ace of aces."

Secretary Baker was greeted with much cordiality and, among other things, said:

"There is present here a man who, with a drawing board and a couple of pencils, locked himself in a room and came out with the Liberty motor," continued the Secretary. "There is at a table in this room Colonel Deeds, who walked around Washington with air

(*Continued on page 7*)

The
Annual
Aeronautical
Exposition
of the
Manufacturers Aircraft
Association
at Madison
Square Garden
and
69th Regiment
Armory
March 1 to 15

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Vol. IV February 8, 1919 No. 6

Secretary Baker's Statement

When Secretary Baker at the Rickenbacker Dinner made the remarkable statement that British ministers "would have traded their guns or the Houses of Parliament for the Liberty motor" when they needed them so much, early in 1918, he made clear a point that is just as important for the future as it was then.

The outstanding fact of the war, which is becoming more and more evident, is that the great problem of warfare is that of matériel. And this is particularly true of aircraft. Airplanes and motors cannot be improvised in a few months. They have to go through many stages of experimental development. When the Secretary said that there was a man present who "with a drawing board and a couple of pencils, locked himself in a room and came out with the Liberty engine," he made such a glaring misstatement of the actual facts that those present who knew the real condition were astonished that such a statement could come from the man responsible for the air program of the future. The Liberty engine was the result of years of development both here and abroad. The putting together of the best practice of aeronautical engine construction and adapting it to American production methods was the work of the few days mentioned. But the Liberty engine did not emerge from the famous room a finished product. It required the co-operation of the best engine builders in this country to bring the Liberty engine to its finished state. Even then, we hear that some of the companies building these engines did not manufacture perfectly satisfactory products.

If those who are responsible for the military and naval air plans of this country can be deluded into the mental state that airplanes and power plants can be created out of the blue by magic pencils, it will lead to a condition which will place our Air Service so far behind other countries that it will take a billion dollars in time of need to accomplish what a little foresight and comparatively little money will do in time of peaceful preparations.

Chicago-New York Airship Line

The announcement by the Manufacturers' Aircraft Association that one of its members is investigating the feasibility of establishing a passenger service, by means of medium-size rigid airships, between New York and Chicago furnishes an interesting indication that the aircraft industry is not only fully alive to the possibilities of air transport, but that it intends to waste no time in carrying these prospects into practice.

The airships it is intended to use for this service are to have accommodations for twenty-five passengers in addition to a crew of ten, and develop a speed of 70 m.p.h., which should enable the vessel to make the trip from New York to Chicago inside of twelve hours.

The saving of time that would be effected by this means of travel represents fully 50 per cent with respect to the existing rail facilities, and therefore would have the time element in its favor. There is, however, one point in the announced scheme which is open to criticism, and this is the fare—$520—it is contemplated to charge for these trips.

While such an extremely high fare may be warranted in view of the great initial outlay the establishment of a commercial airship service undoubtedly requires, it seems that such a policy would actually prove a boomerang in popularizing commercial aeronautics, for very few at this cost would be likely to use this means of transit, and even then only out of curiosity. And once the novelty of the scheme would wear off, there would be no bulk of public to support such a service.

If an air transport service is to become a commercially workable proposition then the passenger fare must be kept within such limits as will attract a sufficiently large section of the public owing to the fact that the saving of time effected by travelling in aircraft will more than compensate for the price paid therefor. To expect that the public generally will travel by air for the mere pleasure of experiencing novel sensations at exceedingly high fares is a fallacy which it is well to explode at once.

The high cost of establishing commercial air services must of course be borne by some agency; but if the scheme is to be a success then it seems that—until such services become revenue earners—Government subsidization will best solve this problem. The Government can well afford to consider this phase of the problem, as all aeronautical development will add to the military and naval resources of the country.

Cost of Airplane Operation

The costs of operation of the Army airplanes that flew from San Diego to Washington are interesting, as they are an attempt to figure cost per mile. The total cost of this pioneer flight was $8,827.50, or an average of $2 a mile for four airplanes and eight men. Comparison with the results given out by the Post Office, which does not include depreciation but does add salaries, shows that 50 cents a mile for a two-seater is a general figure that can be used with safety.

The four coast to coast airplanes cost $12,000 each, a total of $48,000. Between San Diego and New York City four propellers had to be replaced and there were other repairs which came to an estimated total of $1,500. Each airplane consumed fifteen gallons of gasolene an hour, a total of 3300 gallons. This fuel cost an average of neary 50 cents a gallon, or a total of $1,645. One-half gallon of oil was consumed each hour, or a total of 110 gallons, costing $82.50. It is estimated that each engine depreciated in value one-fifth and each airplane less than one-tenth. The engine that was removed was not taken out because of deficiency, but to save time. Thus the depreciation on engines may be estimated at $480, and on the airplane at $4,000.

Anyone who has figured out the cost per mile of an automobile knows that there are so many variables that no accurate figures can be arrived at, but it is desirable that some generalizations should be secured which will be convincing as to the comparatively moderate cost of operating an airplane, speed and carrying capacity considered.

More and more will the aeronautical industry be called on to furnish costs of upkeep and figures such as are given here and those coming monthly from the Post Office will assist in widening the possible field of airplane users. The motor truck has come into its own through the convincing figures that have been assembled and presented to prospective purchasers. In these calculations, the time, speed and distance elements have had an important part. Similar figures demonstrating the practical value of the airplane will do more toward creating an aeronautical commerce than all the generalizations that can be written.

The Aero Exhibition

If the exhibition of airplanes at Madison Square Garden approximates the hopes of the Manufacturers Aircraft Association, it will unquestionably be the most interesting show from the standpoint of the public ever held in New York.

Everyone who had a part in the air program of this country during the war should plan to visit the exhibition.

AIRCRAFT'S ARTISTRY AT THE BIG SHOW

Decorative Plan for the Garden in March Adopted

SOME OF THE EXHIBITORS

Manufacturers' Aircraft Association Arranging for the Army and Navy and Commercial Exhibits

So extensive are the exhibits available for the annual aeronautical exposition of the Manufacturers' Aircraft Association that they have been divided into priority classes. The show committee, having decided on the general scheme of decoration, is successfully endeavoring to dispose of the commercial and governmental exhibits to the most artistic advantage. After the association display is cared for and the outstanding army and navy pieces properly placed, those objects contributed by the government and classified as of first importance will be installed. By this process of elimination it is believed that the most impressive exhibition can be produced.

Some Exhibitors

Some hint is already to be had covering the manufacturers' display. It is known that the Dayton-Wright Airplane Company, of Dayton, Ohio, will have two machines on view, one of which, it is declared, will be novel in design and indicative of the new mode of travel. The Curtiss Aeroplane & Motor Corporation, of Buffalo, N. Y., has reserved space for four planes and seaplanes. The L. W. F. Engineering Corporation, of College Point, L. I., is to exhibit three; the Aeromarine Plane & Motor Company, of New York City, will have one special design on display. Three Thomas-Morse models from the factory at Ithaca are to be placed, as well as one from the Burgess Company, of Marblehead, Mass. The Gallaudet Aircraft Corporation, of East Greenwich, R. I., is to show two of its productions.

While most of the foreign exhibits will be made directly by the United States Government, there is considerable interest in the model to be shown by Pomilio Brothers, Italian manufacturers, with offices in New York.

Balloons to Be Shown

Information just received from Washington indicates that balloons are to form no small part of the exposition. The army has a considerable number of these, of various types and sizes, ready to display. It has been suggested that a Caquot be inflated in Madison Square Garden. Army engineers who have figured on this work say that it can be done, although the balloon measures 96 by 30 ft. Another example is the famous French barrage balloon, 30 by 15 ft. It was this type of balloon that entered prominently into the defense of Paris.

Representatives of the army and navy during the past week have been in frequent consultation with the show committee of the Manufacturers' Aircraft Association. The main navy exhibit, the experimental N C-I, which has flown with fifty passengers, has been placed at one end of the Garden. The army will have another great type of flying machine to match the N C-I. The army representatives have expressed a desire to show either a Handley Page or a Caproni, these being the largest examples available, and the committee is now working on the problem of placing such army plane, either in the Garden or in the Sixty-Ninth Regiment Armory, which will be largely given over to war trophies.

President Wilson's Proclamation

President Wilson has issued, under date of December 16, 1918, a proclamation revoking the proclamation of January 1, 1918, which imposed restrictions upon private airplane exhibitions in the United States. The proclamation follows:

BY THE PRESIDENT OF THE UNITED STATES OF AMERICA A PROCLAMATION

"Whereas on the 1st day of January, 1918, a proclamation was issued forbidding the exposition of aircraft in the United States or its possessions; and

"Whereas, the reasons requiring such prohibition have ceased:

"Now, therefore, I, Woodrow Wilson, President of the United States, do hereby repeal and annul the said proclamation, and do remove the prohibition therein imposed upon private aeroplane exhibitions.

"In witness whereof, I have hereunto set my hand and caused the seal of the United States to be affixed.

"Done this 16th day of December, in the year of our Lord 1918, and of the independence of the United States of America the 142d.

WOODROW WILSON.

By the President:
Robert Lansing,
Secretary of State.

The exposition will open March 1 and will continue, Sundays excluded, through March 15.

First Plane with Liberty Engine

Automotive engineers will have a direct interest in the annual aeronautical exposition. The story of the first plane to fly the first Liberty engine made for the United States Government is told by the L. W. F. Engineering Corporation, College Point, L. I., manufacturers of the airplane in which the first engine was installed and flown. When the Liberty was offered to the government, airplane producers were called into conference. The L. W. F. contracted to design and build within ten days a flying machine in which the Liberty engine could be actually tested. On the ninth day thereafter the Chief Signal Corps Inspector at College Point wired Washington that the plane was ready. The engine was installed, and this L. W. F., model F, with an untried motor, designed and built under stress of war, took the air with ease. This was on Aug. 21, 1917. The L. W. F. climbed 7,000 ft. in 10 minutes and reached its maximum altitude of 19,000 ft. in 41 minutes. The speed developed was faster than the Nieuport Scout, one of the leading European planes at that time. It was in this L. W. F., flying the the Liberty motor, that the late Colonel Roosevelt rode when he made a surprise visit to College Point.

Roy U. Conger of the United Aircraft Engineering Corp., Who Negotiated the Big Canadian Airplane Deal

(C) *Western Newspaper Union*

News from Weimar by Airplanes

Transformation of Weimar from a literary shrine and unimportant provincial town into the seat of the German National Assembly is presenting physical difficulties of no small calibre.

The chief problem is in connecting Weimar with the outside world, as the town, which in recent years had partly disappeared from notice as a commercial and railway centre, is wholly unequipped for accommodating an important political gathering and the attendant demands of newspapermen. At present more than 1000 telegraph and telephone experts are at work here establishing needed communication.

In spite of these preparations the press of Berlin, which continues to lament the selection of Weimar as the seat of the Constituent Assembly, fears that the pressure of news will find facilities lacking. It is now proposed to establish aerial communication between Weimar and Berlin so as to lessen the burden on the wires. Connection also will be established with the wireless station at Nauen for overseas transmission.

Blower Comes from Indiana

Flying Sergeant John Blower, R. A. F., who accompanied Capt. Lang, R. A. F., when a new world's altitude record of 30,500 feet recently was established, comes from Rosedale, Ind.

Blower volunteered at the beginning of the war and is credited with a year's overseas service. He previously was stationed at Kelly Field, Texas, and Fairfield, near Dayton, Ohio. His last promotion was to that of air mechanic.

SMITH'S BILL LICENSING AVIATORS

Text of Measure Introduced by New York Congressman

BENEFICIAL DISCUSSION

An Aircraft Board of Three Persons Under the Secretary of Commerce Is Provided

The bill introduced by Representative Charles B. Smith, of New York, on Jan. 17, has been referred to the Committee on Interstate and Foreign Commerce. It has aroused much discussion among flyers who are contemplating entering the commercial business of passenger and freight carrying. Owing to the fact that the steamboat inspection service is carried on along parallel lines, this bill will start a movement which will have a good result whether eventually the licensing is placed in the Department of Commerce or not. The bill provides:

That all persons not in the military or naval service of the United States are hereby prohibited from operating any aeroplane, balloon, or other invention or device used for navigating the air without first obtaining a license from a board appointed by the Secretary of Commerce as hereinafter provided.

SEC. 2. That the Secretary of Commerce is authorized and directed to appoint three persons who shall be known as the Aircraft Board, and who shall have power to issue licenses for the operation of machines or other devices which traverse the air for commercial or other purposes.

SEC. 3. That the Aircraft Board shall consist of three men, two of whom shall have had practical experience in the construction and operation of aeroplanes, and one of whom shall have practical knowledge of the construction and operation of a dirigible balloon. The Secretary of Commerce shall designate one of the board as chairman, who shall receive a salary of $4,500 a year; the other members of the board shall receive a salary of $4,000 a year each. The Secretary of Commerce shall provide offices for said board; and such clerical assistance as may be needed shall be employed with the approval of the Secretary of Commerce.

SEC. 4. That it shall be the duty of the board to arrange for and conduct examinations of persons who apply for licenses to operate aircraft machines, balloons, or other similar devices, and a license shall not be issued to any person who, in the opinion of the board, is not qualified to operate the machine or other aircraft device covered by the license for which he has applied. The board may designate persons to conduct examinations at distant points or for the convenience of applicants for licenses. Persons so designated must have qualifications similar to those required of members of the board; compensation for the examiners so designated will be fixed with the approval of the Secretary of Commerce and in no instance shall it exceed $2,500 annually for any examiner.

SEC. 5. That traveling and subsistence expenses shall be allowed on the same basis as that provided in existing law for officials of the Department of Commerce. The sum of $50,000 or as much thereof as may be necessary is hereby appropriated out of the money in the Treasury not otherwise expended to carry out the purposes of this Act.

SEC. 6. That the Aircraft Board hereby created is authorized to issue temporary or probationary licenses until such time as a plan for holding examinations is provided and an opportunity given to applicants to try said examinations. When, however, a sufficient time has elapsed and ample opportunity given to hold the said examinations conducted by the Aircraft Board and for any applicant to try such examinations, it shall be unlawful for any person not in the military or naval service of the United States to operate an aeroplane, dirigible balloon, or other device for navigating the air, and any person who operates an air device or invention in violation of the terms of this Act shall be guilty of a misdemeanor and liable to a fine of not to exceed $100 or six months' imprisonment, or both, for the first offense, and imprisonment for not to exceed six months for any subsequent offense.

BIG FIRE AT THE ROCKAWAY NAVAL STATION

Eight Seaplanes and Twenty-five Liberty Engines Lost

WIND SAVES THE NC-1

Two Buildings Destroyed and the Loss Is Estimated at Several Hundred Thousand Dollars

Fire caused a loss of several hundred thousand dollars at the Naval Air Station at Rockaway Point, L. I., on Jan. 31. Two buildings valued at $60,000 each were destroyed, twenty-five Liberty engines were wrecked beyond repair, and eight modern seaplanes and quantities of oil and other supplies were burned. The fire was fought by 1,500 men from the air station and from Fort Tilden.

The fire started at 10:30 o'clock in the morning when the gasoline torch which Quartermaster Johnson was using in making some repairs in the Construction Building exploded. The burst of flame caught in some linen used for wing covering, and in a few minutes the building, 100 by 100 ft. was spouting flame.

In the building were nine seaplanes, four of the H S-1; four of the H S-2, and one of the N-9 type. By quick work men succeeded in wheeling out the N-9 before the fire reached it and this was the only thing in the building that was saved. This is a slow type of machine equipped with a Kirkham engine, used for patrol purposes. It was in this building that twenty-five Liberty engines were destroyed.

Gasoline Rolled Into the Water

One hundred feet from the Construction Building was Building No. 1, a hangar in which were several seaplanes. Stored between the buildings were about 200 barrels of gasoline, which a large force of men started to roll into Jamaica Bay. While they were at this task the flames leaped the intervening space and caught Building No. 1. Under this canopy of fire and in a shower of sparks the men continued to work. They succeeded in rolling nearly all the barrels of gasoline into the water before the intense heat drove them away. In the meantime the fire had fastened on the hangar, but before it assumed large proportions all the seaplanes had been saved. It was said, however, that two Liberty engines were destroyed in this building.

Soon afterward the fire spread to a shed near Building 1, in which were stored barrels of fine oil used for lubrication and quantities of an inflammable wing "dope." Several times there were explosions with sheets of flame which forced the firemen to fall back. In two instances the force of the explosions sent flaming barrels high in the air. One of these fell in a field and set fire to the brush, and another landed on Building 2 and broke through the roof.

The NC-1 Saved

The energy of the volunteer fighters and a shift in the wind saved the other buildings. About 300 feet from the Construction Building was a long steel hangar containing a navy airship. The engines were undergoing repairs and the men were unable to remove the airship from the shed. They managed to save the building by closing all openings, and while some banked wet sand against the sides, others, stationed on the roof, extinguished the sparks that fell upon it.

The shift in the wind saved from destruction the Curtiss hangar and its contents which were in the path of the fire. In this hangar was the N C-1, the world's largest seaplane. Besides, it contained a so-called Liberty Fighter, a plane with which the Navy is experimenting, it was said, which is reported to be capable of a speed of 139 miles an hour. There were other machines in the building. The volunteer fighters saved some fifty machines.

Harris & Ewing

Lieut. Comdr. J. C. Hunsaker, Assistant Naval Constructor

Jerome Clarke Hunsaker, Lieutenant Commander, Construction Corps, United States Navy, was born in 1886 at Creston, Ia. In 1904, he was appointed to the Naval Academy from Michigan and graduated in 1908 with highest honors. After graduation he served for approximately one year in various ships on the Atlantic and Pacific coasts.

In 1909 he was ordered to the Massachusetts Institute of Technology for a graduate course in naval architecture, which was completed in 1912 and carried with it the degree of Master of Science.

After completing the course, Lieutenant Hunsaker was attached to the Boston Navy Yard for nearly a year. In June, 1913, he was ordered to the Massachusetts Institute of Technology for special duty in connection with a course in aeronautics under the Department of Naval Architecture. During the summer of 1913 he made a tour of the United States, England, France and Germany, collecting information concerning the details of developments, methods and resources used for the prosecution of aeronautical investigation. Lieutenant Hunsaker continued on duty at the Massachusetts Institute of Technology until 1916. During this tour of duty he established a graduate course in aeronautical engineering and supervised the installation of a wind tunnel modeled after European laboratories. While at the institute he carried on much valuable research work and study, and in 1916 was awarded the degree of Doctor of Engineering.

Since 1916 Lieutenant Hunsaker has been on duty in the Bureau of Construction and Repair, Navy Department, Washington, D. C., in connection with the aeronautical work of that bureau. He was commissioned Assistant Naval Constructor with the rank of lieutenant (j. g.) in 1910, promoted to lieutenant in 1916, and again promoted to the rank of lieutenant commander in December, 1917.

During his tour of duty at Massachusetts Institute of Technology and subsequent to that time he had written numerous scientific papers on aeronautical subjects. Some of the more important of these are:

Translation of Eiffel's "*La Résistance de l'Air et l'Aviation*"; "A Review of Hydrodynamical Theory as Applied to Experimental Aerodynamics"; "Stable Biplane Arrangements"; "Dynamic Stability of Aeroplanes"; Chapter on "Aeronautics" in Mechanical Engineer's Handbook (Mark's); "Experimental Analysis of Inherent Longitudinal Stability for a Typical Biplane."

Lieutenant Commander Hunsaker soon after the signing of the armistice went abroad, where he now is on his second trip of aeronautical investigation.

Airplanes Requested for Forest Patrol

Requisition for 10 airplanes for forest patrol purposes in the Pacific Northwest has been made, according to announcement by Clyde R. Seitz, supervisor of the Cascade National Forest, with headquarters in Eugene, Oregon. He expects that two machines will be assigned to this city—one for the Cascade forest and the other for the Siuslaw forest—the supervisor of which also has headquarters in Eugene.

Either forest may be reached from Eugene by airplane within an hour.

Has F. R. McFetridge Obtained a License?

The purchase of the first pleasure airship in the state by F. R. McFetridge of Baraboo, Wis., has called to the attention of the legislature the need of aircraft legislation in Wisconsin. A bill will probably be presented soon providing for the registration of planes owned in the state.

Mr. McFetridge has ordered a Packard-Lepere two-seater cruiser type of airplane.

The ship will cost between $12,000 and $15,000.

ENLISTED MEN'S ADVANTAGES IN THE A. S.

Average Pay Is Better Than That of Civilians

CAN PUT BY $500 A YEAR

Tables Which Are Interesting to Those Who Are Considering Remaining in the Service

Following the announcement by the War Department that enlisted men might remain temporarily in the military service, upon their own request, it is of interest to know just what advantages are offered to the enlisted men of the Air Service.

There are many things to be considered in the Air Service. The most important thing is the aparent disparity between pay of civilians and pay of enlisted men in the Army. At the first glance everything seems to be in favor of the civilian, when as a matter of fact if the question was analyzed closely, the average pay of the enlisted man is much greater than that of a civilian.

One point that seems to have been overlooked entirely is the question of retirement pay. An enlisted man usually, before retirement, obtains the grade of Master Electrician. After 30 years service his retirement pay amounts to $90 a month, or $1080 a year. This is equal to an annuity of $1,000 a year, which in the open market would cost a man fifty years of age, $15,000. In other words, an enlistment is putting by $500 a year for each of the thirty years that he serves. This may be considered a part of what he earns, and should be included as a part of his salary.

The following tables of pay, figuring the ordinary expenses of the civilian, which has to be deducted from his salary; are interesting:

	Master Electrician	*Sgt. 1st Cl.*	*Sgt.*
Room and Board @ $40 a month per year.......	$480	$480	$480
Clothes for year........	170	170	170
Saved for "Annuity" per year	500	500	500
Base Pay, per year......	900	540	360
	$2050	$1690	$1510
50% increase as Aviation Mechanician or for flying status	450	270	180
	$2500	$1960	$1680

From information received from the Department of Labor, the average pay of the civilian from twenty to twenty-five years of age is $885 per annum. This takes into consideration the amount of time which he is unemployed on account of holidays, change in position, etc. From the above it will be seen that the comparison is all in favor of the Air Service.

In addition to the question of salary, the following points are of interest: Liberal allowances of furloughs in time of peace; free medical attention; excellent chance to travel; free amusements and athletic facilities; separate quarters for non-commissioned officers; commissary privileges to married men, and 4 per cent interest paid on all deposits by the Government.

Army Salvage

During the month of December, 1918, the Salvage Division reclaimed and returned to stock for reissue 1,382,397 articles of government issue of clothing and equipment at the various camps and cantonments throughout the United States. This amount included 1,185,344 articles repaired by government shops and 197,053 articles repaired by contract.

Col. F. M. Jones Expects to Resign

Col. Frederick M. Jones, A. S., formerly commanding officer at Chanute Field, writes from France that he expects to resign from the service as soon as he gets home.

CONGRESS AND MONEY FOR THE AIR SERVICE

Embarrassment Caused by Lack of a Definite Policy

FUTURE OF LANDING FIELDS

Contracts for Aircraft Construction to the Amount of $550,000,000 Are Still Outstanding

The House Military Committee is bringing out information in regard to military aeronautics that show how great the whole undertaking was; but the most interesting fact developed in the course of the hearing is that when the Division of Military Aeronautics, on the direction of the General Staff, stating the requirements of the division for the ensuing year, advised that provision be made for an organization of 45,000 men, the General Staff arbitrarily ordered that that number be reduced to 22,000 enlisted men and 2,000 officers.

It seems that the D. M. A. Board had been directed to prepare its estimates first on the basis of the so-called War College bill, not yet released from the desk of the Secretary of War, and then was ordered to readjust them on the basis of an army of 500,000 men. It was on the latter basis that the board advised that the organization be fixed at 45,000 men and officers.

Appropriations for Two Branches

The appropriation will cover the two branches—aviation, for which the division is asking approximately $18,000,000, and production, for which it is asking $17,000,000. The $18,000,000 are needed for keeping up the peace-time organization of 24,000, for which purpose 2,000 planes will be required, one-half of which is to be held as a reserve. This scheme of organization has not been definitely approved by the General Staff, but it was made in accordance with its direction. The appropriations do not provide for any new construction other than for experimental purposes, since the airplanes required will be taken from the large stock on hand.

In response to questions from the committee members, Colonel Lyons states that aircraft production had produced 35,000 engines, of which 4,000 had been shipped to the other side, and the balance had been variously distributed. It had on hand 18,557 airplanes of all types. It purchased abroad, mostly in France, 5,158 airplanes, most of them, pursuit and the remaining few practice planes. It had sent to the other side 2,339 combat planes, mostly DeHaviland 4s, had 688 in transit, had turned over to the navy 155, sent 1,008 to schools for training purposes and 396 were delivered and ready to be shipped. It had within the United States 8,630 airplanes for training purposes scattered throughout the country in the various training schools.

War Appropriation Not Used

The total appropriations for aircraft production and operation had been $1,449,000,000; but not all of that huge sum had been used or committed. The bill reported favorably by the House Appropriations Committee to cancel sums granted for emergency purposes had returned to Military Aeronautics an amount sufficient to cover all obligations for the current fiscal year.

Mr. Tilson pressed for information as to the number of airplanes that would not fly or that were obsolete; and the same fact as to the engines, but these details could not be accurately given and were to be submitted later to the committee.

In answer to the questions of Mr. Hull the fact was brought out that the government had purchased in France, at a cost of about $28,000,000, approximately 5,000—mostly pursuit—planes of the type given to the aces for single combat with the enemy's machines. The commission in France had recommended that American production be directed to the De Haviland, it being swift in pursuit, although not adapted to maneuvering; but carrying two men and armed with two pilots it was well able to defend itself against German pursuit planes. A commission in France is now arranging with that nation for the adjustment of contracts and payment for unused material.

Unsettled Contracts Outstanding

Major Downey said that the War Department still had outstanding unsettled contracts for aircraft construction to the amount of $550,000,000; and that his branch was engaged in closing them out and settling with the contractors. About one-half of the contracts had been completed by the contractors within the terms and specifications of the written contract; and that most of the contractors had done commendable work.

In most instances the government could not be exempted from paying even where the work had not been completed within the specified time owing to the failure of the government to provide the materials as the manufacturer required them. The War Department had adopted as a policy the payment of cost plus 10 per cent to contractors who had faithfully tried to carry out their part of the contract. Most of the contracts were let out on prices fixed by the government, since no manufacturer could foretell the cost of material. Many of the contractors will lose money on account of their contracts with the government, because in making their plants ready to do the government work they had reckoned as a part of their profit the extension of their factories; but the government by taxing them 80 per cent on this profit had compelled them actually to take a loss.

Vacillating Policies

When Colonel Gillmore was telling the Committee about the appropriations, he stated that his board was embarrassed in making its estimates by the fact that at first the General Staff proposed to consolidate aircraft production and the Division of Military Aeronautics, but subsequently decided that such a combination ought not to be made. He said that the number 45,000 for aeronautic organization was based upon the tables of organization for an army of 500,000 men, but he could not get approval for more than 24,000, or the number required for 92 squadrons.

In response to the question of Chairman Dent as to the Department's policy concerning the retention of aviation training fields, Colonel Gillmore said that its program called for the use of fourteen training fields for a strength of 24,000, but that for a strength of 45,000 we should retain all the aviation fields. He said that under the direction of Congress the department had bought none of the fields, but that it would recommend legislation authorizing the purchase of at least a part of them. It would be good economy to buy them all, since the department had more than $65,000,000 invested in buildings in the several fields, and that they could be sold to better advantage than they could be salvaged; besides, many of them will have to be retained for the purpose of storing aviation material, even if Congress should decide not to continue their use as flying fields. Mr. McKenzie argued that it was doubtful whether it would not prove better to dispose of the whole thing as it stood on account of the high expense of maintaining the structures on the grounds. The fact was developed that the rent of most of the grounds almost equaled the prices for which they can be purchased.

Brig. Gen. Charles Lee, R. A. F.

Brig. Gen. Charles Lee, R. A. F., who is leaving the country for England on Feb. 8, has done a real service to this country. Coming as he did at the most critical time of our air program, his advice has been most valuable. His splendid accomplishments as a flyer thrilled Washington and did a great deal to convince the government officials that acrobatics must be an essential part of the aviator's training. He returns home with the good wishes of the officers of the Air Service. He is to be succeeded by Brig.-Gen. L. E. O. Charlton.

WORKING FOR AIR MAIL IN NORTHWEST

Letter Sent by W. E. Boeing to City Authorities

SEEKING LANDING FIELDS

Immediate Action Is Called For by the President of the Aero Club at Seattle, Wash.

W. E. Boeing, president of the Aero Club of the Northwest, Seattle, Wash., is sending the following letter to the proper authorities of the leading cities of the States of Washington and Oregon:

"The Aero Club of the Northwest is compiling data to be submitted to the Post Office Department with respect to the establishment of the Air Mail Service in the Northwest. The Aero Club is also compiling data with respect to air maps and air routes for commercial and passenger flying and the following preliminary information is earnestly requested:

"1. Has your city any facilities or ground at present which will permit of landing facilities for land planes?

"2. What facilities for landing of flying boats and seaplanes?

"3. If grounds sufficient for landing and getting away do not exist, can flying fields be established in your city or immediate vicinity thereto?

"4. What civic body or group of men would be most interested in securing and obtaining these facilities in your city?

"For your information the matter of requirements in flying fields call for three or four hundred yards of smooth ground which will permit of landing and getting off into the wind, the prevailing winds being considered, unless the distance be available in all directions. If surrounded by timber or buildings, the field must be of greater size.

"The airplane is going to come into general use very rapidly as a means of commercial transportation, and the necessity that different communities provide facilities for its encouragement is as important as the establishment of highways has been in the development of motor transportation. Without highways we could not be served by motor transportation, and without flying fields we will not be served by air transportation.

"The Post Office Department contemplates a very extensive program and is going to establish mail services only where facilities are afforded them, but will not create them themselves. The cities of the East enjoying the advantages of this service today furnished the necessary facilities. The time for us to act is now. The 25,000 aviators returning to civil life demand this, as many of them are anxious to continue in aviation."

Also the following resolution was passed recently by the Board of Trustees of the Aero Club:

"All men in the aviation services of the United States, both Army and Navy, who have won their wings are eligible to a special membership in the Aero Club of the Northwest. All men eligible are urged to get in touch with the Aero Club for mutual benefit, particularly to hasten the development of aviation in the Pacific Northwest for commercial use and for the various needs of the United States Government."

Transcontinental Flyers Returning

The four army transcontinental flyers who reached New York from San Diego on Jan. 7 are on their return trip starting from Washington. Major Albert D. Smith, in command, hopes to reduce the time of the eastward trip, which was fifty-five hours.

Rickenbacker Dined at the Waldorf-Astoria

(*Continued from page* 1)

planes flying off the tips of his fingers. His imagination peopled the sky with airplanes.

"There are those who think that Colonel Deeds wanted to attain the unattainable, but I want to say that he went into the aircraft problem in such a way that he allowed nothing to stand in the way of the program that he set up. As a result, in the first year of the war the Liberty motor was designed, tested, improved, and placed in quantity manufacture and 1100 motors were produced. In the next six months 18,000 were produced. I make bold as to say that I believe that nowhere in the history of industrial achievement is there a record equal to that.

"I know of what I speak, for I went to France and England and I talked to many ministers, and I want to say that those officials would have traded their guns or the Houses of Parliament for the Liberty motor. Our conversations, no matter on what subject, always ended when they asked me how many Liberty motors we could give them and how soon we could send them over. . . .

"At the time we entered the war the Air Service had twelve fighting planes, two training planes and eleven being built on order, and the entire division of the Signal Corps was composed of 160 persons. The day the armistice was signed there were 4865 planes ready in this country and 6472 in France, a total of 11,337.

"The major part of those in France were of foreign manufacture," he continued, "but we were producing planes more rapidly than the ships could cross the seas, and the problem was to get the planes to the front, a problem of ocean transportation and not of manufacture. Our 160 employees had grown to 18,688 officers and 137,760 men, and besides that we had grounds and training schools filled with cadets.

"France told us that if we sent 4500 airplanes from America that would insure the Allies supremacy of the air. We did in the first year more than the French succeeded in doing under the pressure of war in three years. Nothing was more superb in American business history than that American business men accepted the invitation of France."

Secretary Baker closed by paying an eloquent tribute to Captain Rickenbacker, concluding with this sentence: "In the evening of his life, Captain Rickenbacker's heart will thrill, as ours thrill now, in remembrance of the heroic part he has played in the salvation of civilization."

Captain Rickenbacker's Remarks

When Captain Rickenbacker was called upon he spoke in clear, measured tones, betraying no self-consciousness but rather displaying the self-control which enabled him to bring down 26 boche airplanes. After expressing his gratitude to his friends and admirers, he told how, after fourteen victories over the German lines, he had an ambition to bring down a boche flyer over the French lines.

"One night," the Captain continued, "I saw an enemy machine well over the lines and went up after him alone. I managed to wound the observer in the German machine and then maneuvred to get at the rear, but I had to stop to clean my guns. While I was doing this Capt. Arthur Chambers, who usually accompanied me, saw what had happened and flew up to assist me, so that it was fifty-fifty on the boche.

"Many times when I have felt disgusted with life in the aero squads I have gone out into the front-line trenches and sat with the chaps who lived in six to ten inches of water and suffered without a murmur more discomforts than the average American ever dreams of. I realized that I must be a slacker to complain at my lot. In my opinion every man who went through the trench life in France should have some decoration. The public should thank them and their families who let them go to serve their country."

Tribute to Women

He offered then his testimonial to the navy, without which, he said, our fighting men could not have got to where they might fight.

"And I want to mention," he said, "the mothers, wives and sweethearts, thousands of miles away, who so willingly gave their men to the cause we were all trying to aid. Each and every one of those women should be entitled to some form of decoration—they are far more entitled to it than I am!"

Captain Rickenbacker found time to speak of the Fifth Liberty Loan, and to urge his hearers to oversubscribe it. In closing he said:

"I come back to New York after my two years in France with entirely new views of life, more serious, more thoughtful, and with different views too as to what the United States is and what we all owe to our Nation. I think you will find—and I am glad to say—that 99 per cent of the boys returning after their victory are coming back a million per cent better men, and ready to make a better country than they were before they went away."

Colleagues Present

Captain Rickenbacker's colleagues in the Air Service were represented by Lieut. Paul Baer, who escaped from a German prison camp after five attempts; Brig. Gen. Charles Lee, R. A. F.; Capt. Douglas Campbell, and Major "Jimmy" Meissner, the "Flatbush ace."

The automobile show turned out its full quota for the dinner. Besides leading promoters and manufacturers there were these racing drivers: Louis Chevrolet, Ralph de Palma, Ray Harroun, Barney Oldfield, Ralph Mulford and E. C. Bald.

Aviators Land Among Aborigines

Army pilots, flying from France Field, Panama Canal Zone, recently were forced to land at one of the islands in the Gulf of San Blas, where they encountered a group of aboriginal inhabitants.

The natives had never seen a hydroplane, much less a begoggled aviator, so the whole tribe rushed to the beach, clad in almost nothing and ornamented with scowls and machetes.

According to a War Department message today, the flyers were ignorant of the savages' unfriendliness and rushed up to greet the chief enthusiastically. The enthusiasm and friendliness of the aviators saved their lives, apparently, for they were finally escorted through the village and water was given them for their motors.

In return the aviators gave the naked small boys and the old chief himself some cigarettes, which they appeared to relish.

Designing a Peace Airplane

On account of the cancellation of Government contracts, reduction in both the production of airplanes and in the force has been made at the plant of the Thomas-Morse Co., Ithaca, N. Y. Unfinished work is being completed, but orders for machines, on which work had not been started, have been canceled, and in consequence the number of employes are being gradually discharged. One hundred men and women were released on Nov. 16 and similar reductions will be made from week to week as the Government work is done. Meanwhile, it is reported that the company is designing a new plane to meet the peace requirements of the Air Service.

Board of O. and F. Aviation Report

According to the last (twenty-eighth) annual report of the Board of Ordnance and Fortification, $113,125 was spent or allotted for operations during the fiscal year ended June 30, 1918, leaving a balance on hand of $165,375.80. In consequence of this and prospective appropriations for the fiscal year 1919, the report states that no estimate for the fiscal year 1920 will be submitted. A total of $41,600 was allotted or expended for aviation.

One of the allotments was $500 for a proposed test with a captive balloon, in regard to which the report says:

Test with Captive Balloon

On March 1, 1918, an allotment of $500 was made for the purpose of determining the advisability of the use of captive balloons in the Coast Artillery Service for general observation of battle areas, correction of fire, and possible detection of hostile submarines and mines. This test is being held in abeyance pending departmental action on recommendations relative to the test of captive balloons in connection with the fire control of long-range batteries.

Other allotments for tests or development were made as follows: $15,000 for airplane machine guns; $5,000 for aerial cameras; $4,000 for airplane navigating instruments, and $100 for illuminated compasses. These items are referred to in the report as follows:

Centrifugal Gun

"On Dec. 7, 1917, an allotment of $15,000 was made to the National Research Council to be expended in the development and test of centrifugal machine guns for use on airplanes, the board having reason to believe that such guns, by reason of the very great rapidity of fire which they may attain, are particularly adapted to airplane use.

"In this development work the National Research Council has enlisted the cooperation and assistance of a number of the best engineers and physicists in the country at large as well as those belonging to the Ordnance Department and to other technical departments of the Government.

"The construction of experimental guns is nearing completion.

Cameras for Aerial Photography

"An allotment of $5,000 was made on Dec. 3, 1915, for the purchase and development of cameras for use in photographing from aircraft. Such instruments having been developed by the use of this and other funds at the disposal of the Chief Signal Officer the advisability of withdrawing the unexpended balance of the allotment is now under consideration.

Navigating Instruments in Airplanes

"An allotment of $4,000 was made on Dec. 3, 1915, to the Chief Signal Officer for the development of types of navigating instruments for use in aeroplanes, Such instruments having been developed by the use of this and other funds at the disposal of the Chief Signal Officer the advisability of withdrawing the unexpended balance of this allotment is now under consideration.

Illuminated Compasses

"On July 7, 1916, an allotment of $100 was made for the purchase and test of illuminated compasses. Several types of marching compasses have been procured and tested. As the result of these tests, the Sperry compass has been adopted as a standard, and is now being issued by the Engineer Department."

The balance, $17,000, was made in two allotments, one of $10,000 on April 8, 1916, and one of $7,000 on June 3, 1916, for the development and test of the radio control of submarine torpedoes from an airplane in flight under the Hammond radio-dynamic system. This action was taken pending legislation on the Board's recommendation of an appropriation of $750,000 for the purchase of the rights to the invention, and in addition, $417,000 for procuring and installing one unit of the system.

Montana Patrol Air Stations

Missoula, Mont., will undoubtedly be one of the central forest patrol aviation stations, if present plans of the war department and the forest service are completed, and recommendations made by the officials of district No. 1 are followed. Forestry chiefs have decided that the service cannot afford to plan airplane patrols, as being too expensive, for taking the places of lookouts, but hope that the co-operation of the War Department may be enlisted to the extent that men and machines may be furnished.

Present plans call for the commencement of this patrol next summer, and it is figured that it may extend in a radius of 250 miles each way from the central station. As Missoula is the center of the western section of district No. 1, where most of the fires occur, local officials consider Missoula will be the site of the patrol station, as it is ideally situated from all points of consideration, in addition to the fact that a military post not utilized for other purposes, is available without any extra expense, for the location of the station.

Aviators make the claim that objects may be discerned from a much greater distance looking downward than by viewing them horizontally. A fire, they claim, can be spotted from an elevation of 12,000 feet and a man from a height of 5000 feet.

St. Louis Preparing a Landing Field

Looking forward to future air travel, St. Louis is preparing a landing field in Forest park, primarily for government mail planes, but intended also for sportsmen-aviators.

Mayor Kiel announced that funds for grading had been provided and that the field would be ready April 1. Expense of preparing the field will approximate $25,000.

"Aviators flying from Detroit or Chicago or Kansas City," said the mayor, "knowing that St. Louis has a fully equipped landing field, will come here. St. Louis will become a sort of transcontinental airplane terminus."

Air Postal Service in New Zealand

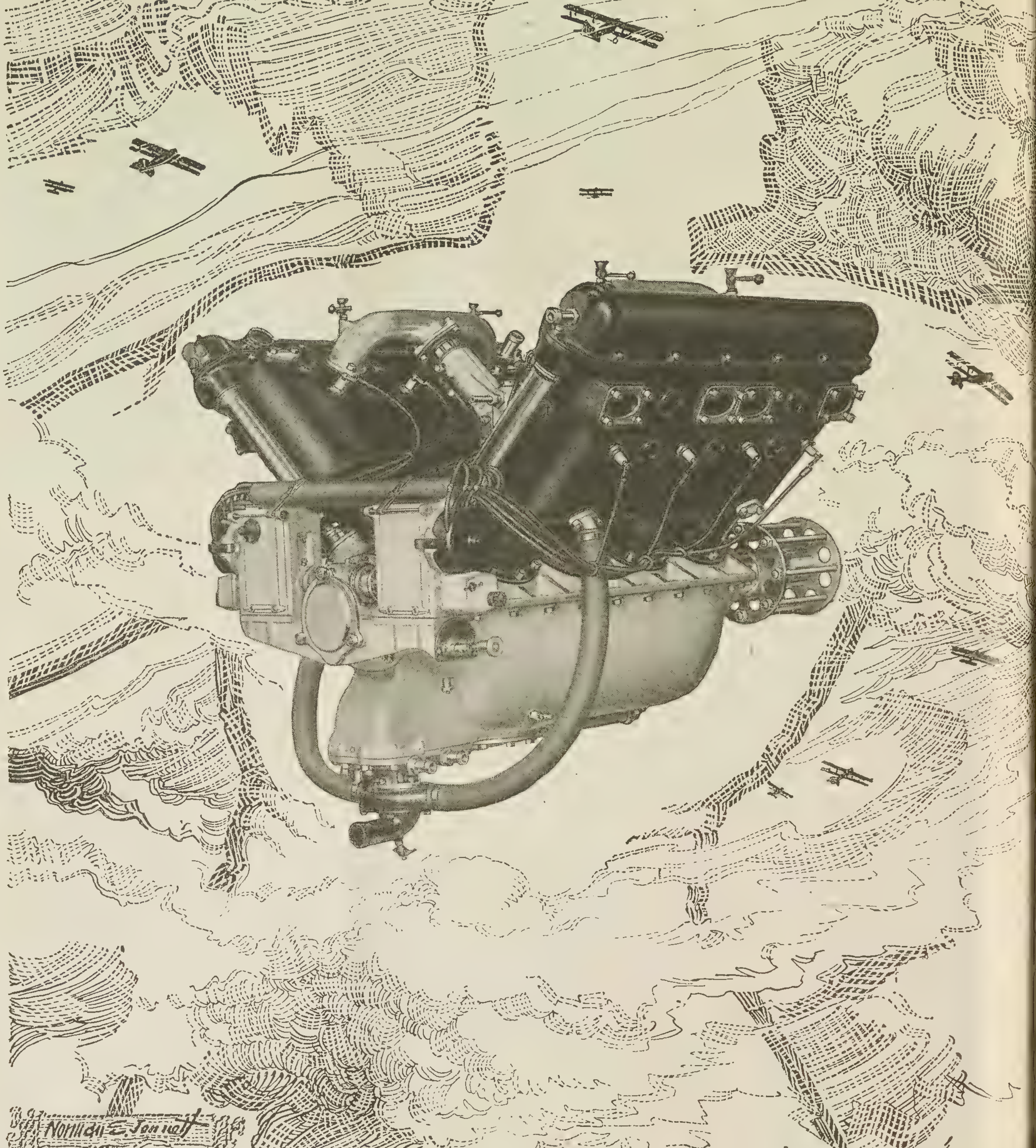
Consul General Alfred A. Winslow, at Auckland, writes:

"The Postmaster General for New Zealand has announced that at the close of the war it is proposed to establish an aerial mail service in this Dominion extending from Auckland to Dunedin, a distance of about 700 miles.

"'I have no doubt about the financial success of the air postal service,' the Postmaster General is reported to have said. 'The amount that we would save in subsidies, paid at present for the conveyance of mails, would more than cover interest and sinking fund on the initial expenditure. The saving in time would be enormous. Mails would go from Wellington to Christchurch in two hours and a half, and from Wellington to Dunedin in five hours.' This would be a very great saving, for as it is now it takes all night for the mails to go from Wellington to Christchurch by steamer, and then on to Dunedin another six or eight hours."

Stop Vedrines' Flight from Roof

The Paris police on Jan. 30 refused to permit Jules Vedrines, the aviator, to attempt a return flight from the roof of the Galleries Lafayette, on which he landed in an airplane on Jan. 19. After the police announcement, the airplane was taken apart and the pieces were brought down by elevator.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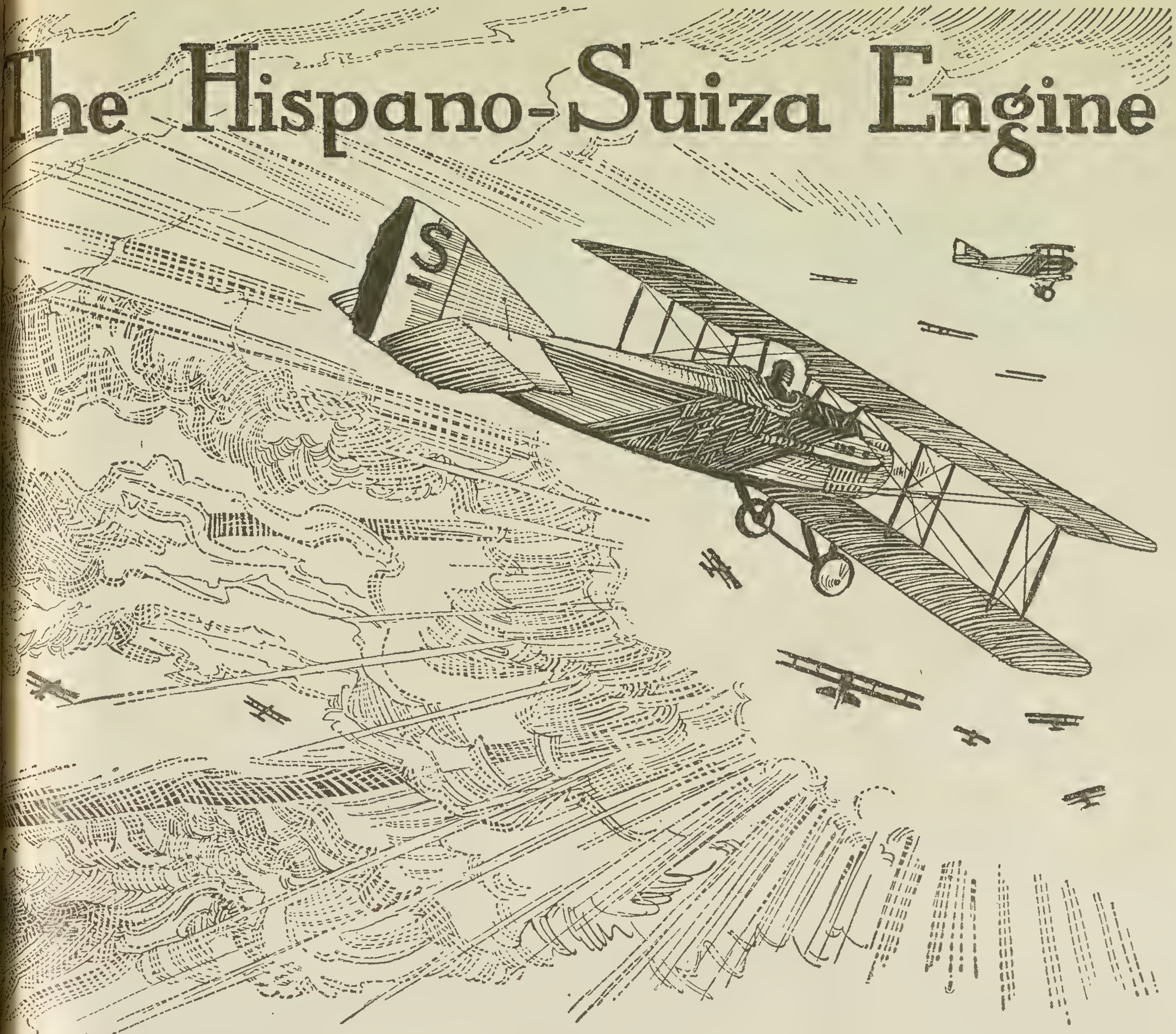

HISPANO-SUIZA developed its world-wide reputation during the early stages of the Great War.

The very peak of its efficiency was reached when the Air Forces of France and England were gaining that now well-understood "Air Supremacy" at the end of the second year of the Struggle. It was then that France's most noted aces, Guynemer, Fonck, Herteaux and others were establishing their marvelous records in the small, swift, deadly one-seater planes—the "Spads"—which were made possible only because of the speed, flexibility and versatility of the Hispano-Suiza Engine.

Since then, in the powering of the one seaters, the two and three seaters, and the heavier bombing machines and hydroplanes, Hispano-Suiza has kept pace with the development of the aeronautical activities of several nations. Hispano-Suiza has reached that point of efficiency which would have been impossible, except where a fundamentally great engine had been developed by the most progressive brains of the industry.

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See The Hispano-Suiza Exhibit at
the Aero Show March 1-15, 1919

AIRCRAFT CORP'N.

Pay During Duty Involving Flying

The following letter from the Comptroller of the Treasury to the Secretary of War is self-explanatory:

I have your letter of January 2, 1919, as follows:

"In view of the action of the Court of Claims in the case of Leonard A. Wolty vs. United States, No. 33939, wherein judgment was rendered in favor of Wolty for 50 per cent increase in pay during period he was detailed to duty involving flying, a revision of your decision of 21 April, 1917 (23 Comp. Dec., 589) affirmed by your decision of July 10, 1917 (24 Comp. Dec., 11) is respectfully requested.

"From the findings of fact by the Court of Claims in the above case, it is evident that the court rendered its judgment on the fact that the man had been properly detailed to duty involving flying.

"It was stated by the court in said findings of fact:

"A reconsideration of the decision of the Comptroller adverse to the allowance of such claims for increased pay was requested by the Secretary of the Navy June 8, 1917, on the ground that only a detail to duty requiring actual flying was necessary and that it was not required that there should be any actual flights in order to entitle the officer or enlisted man to the increase of pay provided by law. Such reconsideration was not, however, allowed and the $188.26 remains checked against the claimant.'

"The contentions of this Department in reference of June 8, 1917, referred to by the Court of Claims was based upon the ground that the only question properly before the accounting officers was whether or not the officer or man was properly detailed to duty involving flying and that the question of whether or not the duty to which detailed involved flying was one for administrative determination by this Department. The court in its action on this case sustains the contention of this Department."

In rendering judgment in the case of *Wolty vs. United States* the court, after finding the facts, concluded upon those facts that the plaintiff was entitled to recover.

The court did not hand down a decision construing the law and this office does not consider that upon the facts in this particular case the conclusion by the court is sufficient to justify a change in the decisions of this office.

While the general conclusion by the court might lead one to believe that the decisions of this office, that more detail alone is not sufficient, were not concurred in, it is not conclusively shown that if a case were presented to the court in which the evidence showed conclusively that while a detail was given no flights were performed or with great infrequency or that the detail was given to a man whose duties did not involve flying, the court would hold that the issuance of the detail was in itself sufficient to authorize the additional pay.

Finding nothing in the action by the Court of Claims to lead me to believe that the decisions of this office on the general principles involved are not justified under the wording of the act of March 3, 1915 (38 Stat., 939), I must respectfully adhere to the decisions referred to. Particular claims coming before this office will be decided, as heretofore, after careful consideration of the facts shown in each case.

Respectfully,
(Signed) W. W. WARWICK,
COMPTROLLER.

Air Service A. E. F. Appointments

The following apointments in the Air Service, American Expeditionary Forces, made by the Commanding General, are announced by the War Department:

To be Captains—First Lieuts. Duncan Dana, Charles W. Babcock, William M. Conant, Jr., Shiras Campbell, Horace B. Forman, Horace E. Westmoreland, Mervyn F. Falk, Hobart A. H. Baker, Horace N. Heisen, Herbert A. Schaffner, Henry H. Nutt, Cecil G. Sellers, John C. Kennedy, Frederick J. Luhr, Harold P. Frank, Maury Hill, Seth Low, Charles L. Heater, Alfred A. Grant, James A. Meissner, William G. Schauffler, Jr., Bradley J. Saunders, Jr., Edwin A. Barnes, Hamilton Coolidge, Selden D. Burchenal, Thomas A. Box, Greene H. Jones, Cedric E. Fauntleroy, Morgan B. More (Aeronautics), Birge G. Clark (Aeronautics), Charles E. Wolfe (Aeronautics), Roscoe E. Pierce, Frederick F. Christine (Aeronautics), George S. Frank, Frederick E. Schilling, Bruce E. Granger (Aeronautics), Stanley Fargo, Russell Hinman and Samuel W. Stone (Aeronautics).

To be First Lieutenants — Second Lieuts. Frederic T. Hollaman, Frank L. Stewart, John A. Taylor, Selmar J. Tilleson, Alexander T. Burr, Murray Ringgold, Edward H. Shea, Herbert A. Claiborne, Thomas C. Davis, Robert D. Connell, Harry G. Montgomery, Horace H. Porter, James A. Blakely (Aeronautics), Henry L. Wallen (Coast Artillery), Malcolm A. Sedgwick, Henry E. Ervin, Joseph Ivan Dise (Aeronautics), Henry P. Full (Field Artillery), John D. Cox, Jr. (Aeronautics), Delbert E. Jones.

Big Browning's Airplane Work

Major-Gen. C. E. Williams in his statement before the House Military Committee let it be known that the Ordnance Department was seeking to develop a machine gun of the Browning type of .50 instead of .30 caliber. General Williams said that such a weapon would, on account of its great power, be of incalculable value in airplane work. The projectile used in the present Browning is hardly large enough to carry the proper material for incendiary and tracer bullets; but the larger bullet would double their efficiency.

Representative Tilson asked if these bullets were employed against individual soldiers; but General Williams told the committee that it was the incendiary bullets that had put the Zeppelins out of business, and that tracer bullets were a guide to the aerial gunner. The Ordnance Department expects also to employ the proposed .50 caliber machine gun with the light artillery in creating barrage fire.

To Feed Belgians from Airplanes

The British Government has allotted a squadron of military airplanes to convey foodstuffs to Belgium for the relief of the population. The service, which is to be daily, will begin immediately between Folkestone and Ghent.

Senate Fight on Air Mail Service

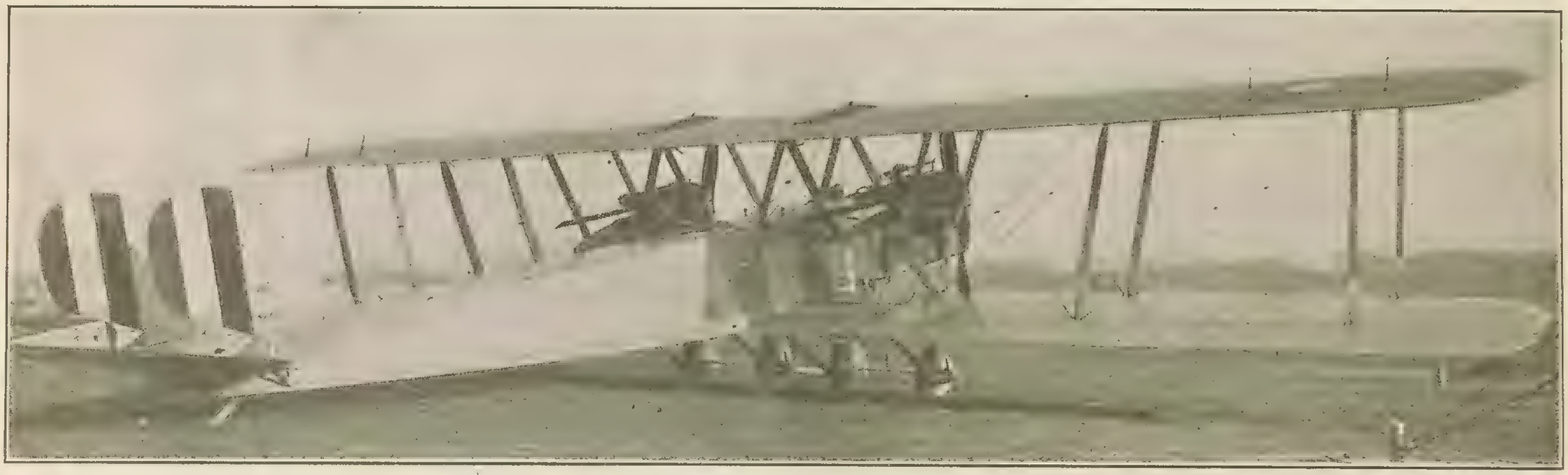
During the discussion in the Senate of the $400,000,000 Post-Office appropriation bill on Jan. 31 Senator New of Indiana introduced an amendment reducing the appropriation for the air-mail service from $850,500 to $300,00 resulted in a general discussion of that branch of the service and the deferring of a vote on the amendment. Senator New characterized the air mail service as an "expensive experiment," while Senator King of Utah declared this was "no time for the Government to take money from a depleted Treasury for purposes of this kind." Senators Swanson of Virginia and McKellar of Tennessee defended the service and urged that the original appropriation be retained.

Newark Liked for Air Mail Terminus

After making an inspection of a tract of land in the northern part of Newark three airplane mail service officials were quoted by T. H. Wheeless of the Newark Post Office as favoring the site for the Eastern terminus of the service. Mr. Wheeless said that James B. Corridon, chief of the Railway Mail Adjustment Bureau; Lieutenant J. Clark Edgerton, chief of flying operations, and Dr. Louis T. Bussler, assistant superintendent of the Air Mail Service, were the men who looked the site over.

Overseas Caps May Be Worn

Rescission of the order prohibiting the wearing of caps worn overseas by soldiers after their return to the United States is announced in a Bulletin No. 63 of the War Department.



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Judge Advocate General's Opinions

Mileage; Aviation Service: An officer in charge of flying was ordered to proceed from Kelly Field, South Antonio, Tex., to Belleville, Ill., to fly an airplane back to San Antonio, Tex., via Lenoke, Ark., and Fort Sill, Okla. *Held*, that on the facts of this case, the return travel appears to have been aviation duty rather than travel under orders within the meaning of the act of June 12, 1906 (34 Stat. 246), and the officer is not entitled to mileage for the air travel from Belleville to San Antonio.

Notes Compare Ops. J. A. G. 245.6, Sept. 12, 1918, digested at page 207 of this bulletin.

Extra Pay for Certain Flying Officers; Army Regulations 1269: The extra pay allowed to certain classes of aviators by Army Regulations, paragraph 1269, as authorized by acts of Congress July 18, 1914 (38 Stat. 514, 515), June 3, 1916 (39 Stat. 166), and July 24, 1917 (40 Stat. 243), does not apply to officers of the Radio Laboratory Signal Corps, through performing regular and frequent flights in radio development work. They are not included in any of the classes designated, and hence are not entitled to the extra pay.

Increased Pay for Aviation Officers; Army Regulations 1269½: Nothing contained in section 1269½, Army Regulations, effective June 10, 1918, shows that this regulation, providing increased pay for certain aviation service, was intended to have retroactive effect. Under this regulation, a commanding officer of an aviation station, camp, school, field, post, etc., does not have authority to make an order which will carry increased pay and allowances from a date prior to that on which the regulation became effective. Neither can increased pay and allowances be authorized by such commanding officer for any time prior to the actual assignment by him of an officer to the duty contemplated by the regulation; although an announcement in a later published order that the assignment to such duty was actually made on an antecedent date would be good, in cases where this is actually the fact.

Discharged R. M. A.'s to Fly Army Ships

The Division of Military Aeronautics has announced that members of the Officers' Reserve Corps who are R. M. A.'s, may be authorized upon application, at the discretion and at the convenience of the commanding officers to make flights in Army airplanes. It is pointed out, however, that cross-country flights should not be permitted and that the regular training of pilots should not be interfered with.

A scheme providing for the use of "ships" by Reserve Officers is in preparation, as part of the permanent organization of the Air Service, but cannot be put into effect at the present.

Lieut. Fonck at Aero Club Dinner

A cablegram from Paris states that Lieut. Rene Fonck, the leading French ace, has received permission from the French Government to represent France at the annual banquet of the Aero Club of America on February 19 in response to a request by the Foreign Service Committee of the club. Lieut. Fonck is preparing to go to the United States at once.

Major General George O. Squier says:
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— Address before the A. I. E. E., January 10, 1919.

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First Lieut. Oscar B. Myers, A. S.

First Lieut. Oscar B. Myers, Air Service, 147th Aero Squadron. For extraordinary heroism in action near Cierges, France, Sept. 28, 1918. Sent on a particularly hazardous mission, he harassed and routed enemy troops. Lieutenant Myers then climbed higher to look for German planes. With two other officers he encountered nine Fokkers protecting a reconnaissance machine, flying in one of the most effective formations used by the enemy. Out maneuvering the hostile planes, the three officers succeeded in routing them. After a quick turn Lieutenant Myers dived at the reconnaissance machine and crashed it to the ground in flames. Home address, S. Oscar Myers, 109 South Third Avenue, Mount Vernon, N. Y.

First Lieut. William T. Badham, Observer, A. S.

First Lieut. William T. Badham, Air Service, observer, 91st Aero Squadron. For extraordinary heroism in action near Nuzancy, France, Oct. 23, 1918. This officer gave proof of exceptional bravery while on a photographic mission twenty-five kilometers within the enemy lines. His plane was attacked by a formation of thirty enemy aircraft; by skillful work with his machine gun Lieutenant Badham successfully repelled the attack and destroyed two German planes. At the same time he manipulated his camera and obtained photographs of great military value. Home address, H. L. Badham, Whitaker Street, Birmingham, Ala.

First Lieut. George C. Kennedy, Pilot, A. S.

First Lieut. George C. Kennedy, Air Service, pilot, 91st Aero Squadron. For extraordinary heroism in action near Jametz, France, Oct. 9, 1918. This officer gave proof of his bravery and devotion to duty when he was attacked by a superior number of aircraft. He accepted combat, destroyed one plane and drove the others off. Notwithstanding that the enemy returned and attacked again in srong numbers, Lieutenant Kennedy continued his mission and enabled his observer to secure information of great military value. Home address, L. Gordon Glazier, 4 Egremont Road, Boston, Mass.

First Lieut. Benjamin L. Atwater, Observer, A. S.

First Lieut. Benjamin L. Atwater, Air Service, observer, 99th Aero Squadron. For extraordinary heroism in action near Landres-A-St. George, France, Oct. 5, 1918. Lieutenant Atwater started on a photographic mission with Lieutenant Alexander pilot, over the enemy's lines. Forced back by seven enemy pursuit planes, he determined to complete his mission, and recrossed the line eight minutes later. A large group of enemy pursuit machines again attacked his plane. Disregarding his wound, he operated his machine gun with such effect that the nearest of the enemy planes was put down out of control. Home address, Mrs. Ella C. Atwater, mother, 152 Maple Avenue, Red Bank, N. J.

Major Harold E. Hartney, A. S.

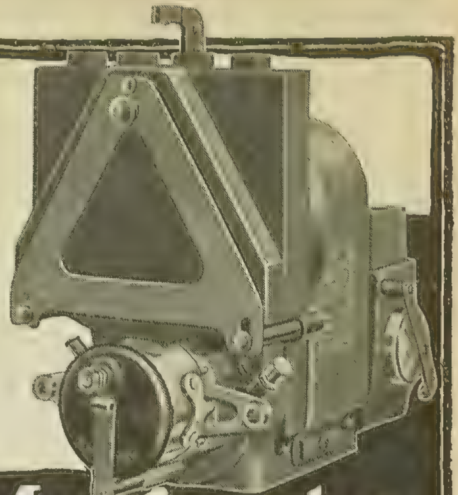
Major Harold E. Hartney, Air Service, 1st Pursuit Group. For extraordinary heroism in action near Fismes, France, Aug. 13, 1918. Major Hartney voluntarily accompanied a reconnaissance patrol. Realizing the importance of the mission, Major Hartney took command, and, although five enemy planes repeatedly made attempts to drive them back, he continued into enemy territory, returning later to our lines with important information. The cool judgment and determination displayed by Major Hartney furnished an inspiration to all the members of his command. Home address, Mrs. Harold E. Hartney, care of Russell Hartney, Saskatoon, Saskatchewan, Canada.

Second Lieut. Richard W. Steele, Observer, A. S.

Second Lieut. Richard Wilson Steele, observer, Air Service, 166th Aero Squadron. For extraordinary heroism in action near Bois D'Barricourt, France, Oct. 23, 1918. While on a bombing raid back of the German lines Lieutenant Steele, accompanied by his pilot, was attacked by six German pursuit planes. They were forced to leave the formation in which they were traveling owing to engine trouble; the enemy began riddling their plane with machine-gun fire. Lieutenant Steele fought them on all sides and is credited by members of the 11th Aero Squadron, who were flying over him several thousand feet, with having brought down one of his opponents. He was wounded twice in the leg and twice in the arm, and continued fighting, although each time he was hit he was knocked down into the observer's cockpit. At last, however, only his tail gun was in working condition, the other two having been disabled by bullets, and Lieutenant Steele sank unconscious into the cockpit. Home address, William Steele, father, 426 East Euclid Avenue, Oak Park, Ill.

First Lieut. John H. Lambert, Pilot

First Lieut. John H. Lambert, pilot, 91st Aero Squadron. For extraordinary heroism in action near Stenay, France, Oct. 30, 1918. While on a photographic mission in the vicinity of Stenay, his work being seriously interfered with by the fire of a formation of enemy planes, Lieutenant Lambert temporarily discontinued his mission, attacked the formation and dispersed it, destroying one plane and seriously damaging another. He then returned to his objective, completed his mission, and returned with information of great military value. Home address, Mrs. Joseph F. Kelley, 45 West Eleventh Street, New York, N. Y.



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Personals

On January 27, the Senate confirmed the promotion of Charles T. Menoher, Temporary Major-General, National Army, as Brigadier General, Regular Army. General Menoher was announced as Director of Air Service on December 21, 1918.

The following named officers are rated as Reserve Military Aviators: 2nd Lieuts. Robert W. Catlin, Richard C. Sogge, Ernest W. Force, Arnold B. Henderson and Edmund Pincoffs, A. S. A.

In a list issued by the War Department on Jan. 29, Aviators Paul L. Holder and Thomas Buffum are reported as having been released from German Prison Camps, and returned to France. Holder's home is at 1018 West 7th Street, Hastings, Neb., and the home of Buffum, who was a prisoner at Altdam, is 1406 Watching Avenue, Plainfield, N. J.

Mr. and Mrs. George Weniger announce the marriage of their daughter, Irma F., to Lieut. Harold M. McKnight, R. M. A., A. S., at Honolulu, H. T., on Dec. 14, 1918. Lieutenant McKnight is attached to the 6th Aero Squadron stationed at Fort Kamehameha, Honolulu.

Lieut.-Col. Earl L. Canady, J. M. A., is now rated as a military aviator from Oct. 25, 1918.

First Lieut. John H. Bauer is ordered from Dayton, Ohio, to Washington, D. C., to report to the Director of Military Aeronautics for the purpose of discharge from the Air Service.

Major John G. Roper is detailed from the Judge Advocate General's Department to the Bureau of Aircraft Production for duty as legal advisor.

Lieut.-Col. Augustus W. Robbins is releived as supervisor of the Northern Supervisory District, and ordered to report to the Director of Military Aeronautics for duty.

Major Frederick C. Bahr and thirty other officers have been detached from the Bureau of Aircraft Production and assigned to duty in the Division of Military Aeronautics. The list comprises five captains, eight first lieutenants, and seventeen second lieutenants.

Major Jenner Y. Chisum is ordered from the Air Service Depot, Garden City, N. Y., to the Division of Military Aeronautics, Washington, D. C., for duty.

Lieut.-Col. Claude K. Rhinehardt has been ordered from Washington to Kelly Field for duty. Until he went overseas Lieutenant-Colonel Rhinehardt was commanding officer of the First Provisional Wing, Mineola.

Lieut. Byron Q. Jones is detailed as a member of the Joint Army and Navy Technical Board in Aircraft. Lieutenant-Colonel Jones succeeds Major Harley W. Lake.

Lieut.-Col. Daniel M. Cheston, Jr., has been relieved as commandant of the Aviation General Supply Depot, Middletown, Pa., and ordered to report in person to the director of Military Aeronautics for duty.

Capt. Byron H. Mills has been appointed to the command of the Air Service School for Radio Operators, Penn Field.

Col. Gerald C. Brant has been appointed commanding officer of Ellington Field. Colonel Brant was until recently acting Assistant Director of Military Aeronautics.

Lieut.-Col. Frederick T. Dickinan, of the Executive Section, Division of Military Aeronautics, Washington, has been appointed commanding officer of Souther Field.

Special Orders No. 11-0, paragraph 59, of Jan. 14, orders Second Lieuts. John G. Williams and William B. Sousa to proceed from the Air Service Depot, Garden City, N. Y., to Bolling Field, and thence to Ellington Field by airplane. This is believed to be the first instance recorded in Special Orders where an airplane has been specified as the means of transportation of officers in the performance of military travel.

Major Adlar H. Gilkeson, who has been acting commander of Chanute Field, has been appointed commanding officer of the 271st Service Squadron, Aberdeen Proving Grounds.

Col. Clarence R. Day has been appointed to the command of the Aviation General Supply Depot, Little Rock, Ark.

Lieut.-Col. Jack W. Heard, formerly commanding officer of Payne Field, has been ordered to the Air Service Depot, Garden City, N. Y., for duty.

Major John W. Butts has been ordered from the Division of Military Aeronautics, Washington, to Souther Field, for duty.

Capt. George Peabody, A. S. A., is announced as on duty requiring him to participate regularly and frequently in aerial flights.

Major Lorin C. Collins, M. C., is ordered from Dart Field to the aerial gunnery school, Chapman Field, for duty.

Announcement is made of the rating of Lieut.-Col. Jacob W. S. Wuest, A. S. A., as a junior military aeronaut, with rank from July 25, 1918. Lieutenant-Colonel Wuest is commandant of the Army Balloon School at Fort Omaha.

Col. Ralph C. Caldwell is ordered from the Army Balloon School, Fort Omaha, to the Army Balloon School, Arcadia, Cal., for duty.

Major Reuben H. Fleet is ordered from Washington, D. C., to McCook Field for duty with the Technical Section. Major Fleet was the first superintendent of the Washington-New York route of the Aerial Mail Service.

Col. John T. Nance, who was formerly commandant of the Army Balloon School, Fort Omaha, has been detailed as Professor of Military Science and Tactics at the University of California, Berkeley.

Lieut.-Col. Thomas Duncan is relieved as commanding officer of Ebert's Field and appointed commanding officer of Carlstrom Field. Lieutenant-Colonel Duncan was the last chief of the Operations Section, Division of Military Aeronautics, recently discontinued.

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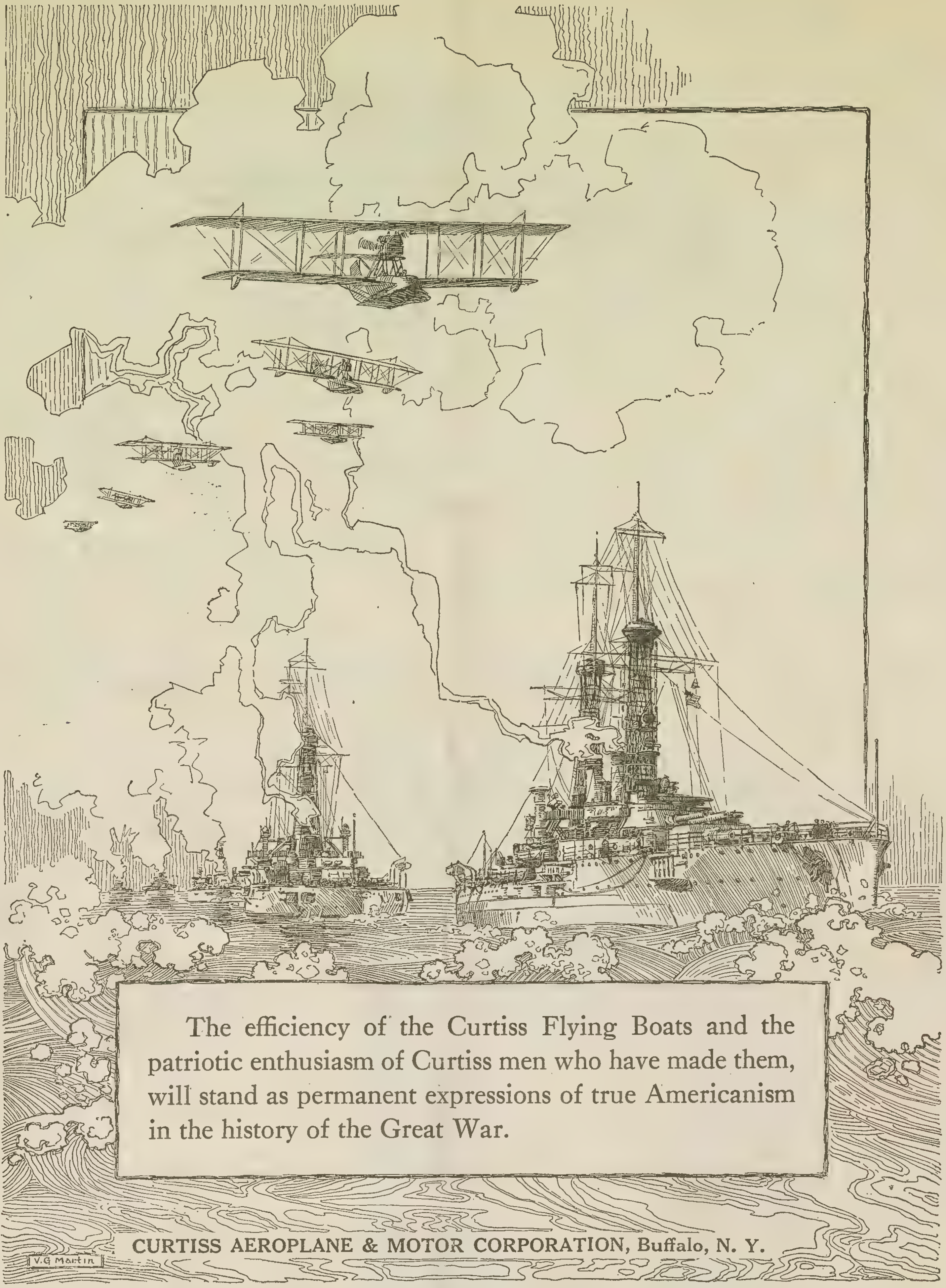

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AIR SERVICE JOURNAL

The National Aeronautic Newspaper

VOL. IV. No. 7 NEW YORK, FEBRUARY 15, 1919 PRICE 10 CENTS

HOW FLYING LICENSES MAY BE OBTAINED

Detailed Report on the Applicant Must Be Submitted

APPLICATION FORMS READY

Furnished Upon Request to Lieut. L. G. Haugen, Secretary of the Joint Board at the Department of M. A.

Applications for flying licenses from civilian pilots should be addressed to the Joint Army and Navy Board on Aeronautic Cognizance, Building "D," 6th and B streets, N.W., Washington, D. C. Lieut. L. G. Haugen, A. S. A., secretary.

In making an application for a flying license the civilian is requested to forward a copy of his or her certificate or license showing that the individual is qualified as a pilot.

The application must be supplemented with full information as to the nature of the aerial project contemplated; the financial backing; the means to be taken to insure the reliability of motors and the upkeep of planes; types and condition of planes, and the number of hours each has been flown. The number of mechanics to be employed should also be stated.

In short, a complete detailed report is desired and standard forms of application are furnished upon request to Lieutenant Haugen, Division of Military Aeronautics.

Board to Rate Flying Officers

General Kenly has appointed a board of officers to pass upon the qualifications and merits of flying officers who have distinguished themselves in action. The board will eventually review the records of all flying officers who were in action with a view to awarding them such ratings as their achievements and abilities may warrant. To date only the pursuit or fighting pilots have received any recognition; this was in the form of a list of sixty-three fliers who have been credited with the shooting down of five or more enemy aircraft, a list which is not complete or up to date.

The new board will not only consider the fighting pilots and observers but the officers who were on other details just as dangerous, tedious and requiring an even greater amount of practice and skill, though not as spectacular. The work of the pilots and observers in the Day and Night Bombardment Squadrons, the Observation and Reconnaissance Squadrons and Balloon Companies which included artillery control and photograph work will now be reviewed and appropriate awards made, in the form of ratings as Junior, and Military Aviators with increase in flying pay.

The board consists of Col. Townsend F. Dodd, Lt.-Col. B. F. Castle, Major Horace H. Hickam and Lieut. Sidney T. Thomas, all of the Army Air Service, Division of Military Aeronautics.

Great Story of the Navy's Aircraft Development Told to the Society of Automotive Engineers

Charles M. Manly, President-Elect S. A. E.

Born in Staunton, Va., Mr. Manly was educated in the primary and academy schools in South Carolina until he entered Furman University at Greenville, S. C., of which his distinguished father, Dr. Charles Manly, was president. In 1896, Mr. Manly graduated from Furman with the degree of M. M. P., master of mathematics and mechanical philosophy. The next two years Mr. Manly specialized in mechanical and engineering courses at Cornell University and was graduated in 1898 with the degree of mechanical engineer.

In the spring of 1896, Professor Langley, secretary of the Smithsonian Institution, applied to Dr. R. H. Thurston to recommend some engineer to take charge of the work which he was just then undertaking for the war department in the construction of a mancarrying aeroplane. Mr. Manly was recommended by Dr. Thurston and took charge of this work under Dr. Langley's director on June 1, 1898.

Moving to New York, Mr. Manly devoted his time to developing some of his own inventions in power transmission. In July, 1905, he organized the Manly Drive Company, of which he has been vice president and chief engineer from its incorporation in 1906 to the present date.

From September, 1915, Mr. Manly has been consulting engineer to the Curtiss Aeroplane & Motor Corporation. Buffalo, devoting his attention during the past three and one-quarter years especially to the duties of chief inspecting engineer.

Mr. Manly is a member of the Society of Automotive Engineers, president-elect and member of the Cosmos Club of Washington and the Aero Club of America. He is also chairman of the aviation section of the standardization committee of the society of Automotive Engineers; member of the International Aircraft Standards Board and was one of the representatives of the S. A. E. to the International Aircraft Standards Conference held in London in February, 1918.

During the two months preceding the signing of the armistice on November 11, Mr. Manly was giving his attention almost exclusively to assisting in the planning of the large production programme on the USD-9A battle planes in connection with Mr. Willys' promise to the government to reach a production of 100 per day during the month of March, 1919.

By Commanders H. C. Richardson and F. G. Coburn

BIG DINNER AT THE ASTOR

Interesting Aeronautical Papers Read by John W. Smith, Grover C. Loening and Alexander Klemin, Engineers

The three days annual meeting of the Society of Automotive Engineers at 29 West Thirty-ninth street, New York, was brought to a close Thursday evening, Feb. 6, by a banquet in the grand ball room of Hotel Astor attended by 1500 members and guests.

The Hon. Job E. Hedges acted as toastmaster and among the speakers were: President C. F. Kettering; President-elect C. M. Manly; G. H. Curtiss, J. N. Willys, C. W. Nash, C. W. Stiger, Henry R. Sutphen, Geo. H. Houston and Alfred A. Reeves, general manager, National Automobile Chamber of Commerce.

Guests of Honor

Guests of honor were H. R. Sutphen, president National Association of Engine and Boat Manufacturers; Camille Cerutti, chief of the Italian Military Mission in the United States; C. W. Stiger, Capt. E. C. Hugh and Capt. George Sykes of the British War Mission, F. H. Russell, president Manufacturers Aircraft Association; C. E. Thompson, president Motor and Accessory Manufacturers Association, and Col. A. O. Seaman, Motor Transport Corps.

After the dinner the guests departed on buses to the Midnight Whirl at the Century Grove, the entire house of which had been reserved.

The following committees handled the details of the convention and banquet:

Meetings Committee—David Beecroft, Chairman; C. F. Scott, Acting Chairman; Herbert Chase, F. E. Moskovics and F. E. Place.

Committee for Reception of Speakers—F. E. Moskovics, Chairman; A. L. Clayden, G. W. Dunham, H. L. Pope, H. M. Swetland and K. W. Zimmerschied.

General Committee on Reception and Acquaintance—N. B. Pope, Chairman; Norman Bell, R. A. Brannigan, S. N. Castle, W. L. Colt, F. M. Dampman, O. L. Formigle, F. S. Gassaway, Hugo C. Gibson, Joseph Husson, W. E. Kemp, Wm. P. Kennedy, Dr. H. C. McBrair, Harold M. Martin, B. B. Mears, L. G. Nilson, W. M. Nones, R. M. Owen, A. J. Poole, F. E. Queeney, W. I. Ralph, C. E. Reddig, Alfred Reeves, H. C. Steinau, H. A. Tarantous, Harry Tipper and Joseph Tracy.

Aeronautical Papers

Papers directly or indirectly relating to aeronautics were read during the convention by Charles F. Kettering, Dr. H. C. Dickinson, John W. Smith, J. G. Vincent, Alexander Klemin, Grover C. Loening, Commander F. G. Coburn, U. S. N., Commander H. C. Richardson, U. S. N.; Commander J. H. Towers, U.S.N.; Clyde H. Teesdale and Starr Truscott.

Three of the papers disclosed for the first time the aircraft achievement of the Navy—those by Commanders H. C. Richardson, J. H. Towers and F. G. Coburn. Excerpts from Commander Towers' address will appear in an early issue.

(*Continued on page 4*)

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Air Mail Service

THE Senate has given evidence of its belief in the Post Office Department's ability to operate a separate service for postal mails by increasing the amount to be made available for this service from $300,000 to $850,000. Senator Smoot's amendment, if it remains, will give the postal authorities the first real opportunity they have had to demonstrate on a large scale the practicality of air mails. The New York-Washington route has always been considered as an experiment and has given much valuable data on which to base conclusions. It has enabled the post office to gather first hand opinion from pilots and constructors and find out for itself the costs and difficulties of aerial mail.

With the increase of the appropriation a real program can be started and the plans that have been talked of put into operation. Perhaps the first step toward reducing the transcontinental mail time can be made. If with the present appropriation one day could be cut off the present time it would demonstrate the worth of the investment. To do this there must be a readjustment of design which will fit into the plans of the postal service. A trial should be made to determine the economy of the Liberty motor and the present design of planes for the service. If they prove to be acceptable in any measure it will mean that the supply can be had without great trouble. At the same time there should be tried the new types of planes that are now being produced for weight carrying so that information of their performance can be secured and compared.

It is to be hoped that the post office will not confine its service to land types of machines but will inaugurate a seaplane service which may have in it possibilities of the widest scope. The water has always been the slowest method of mail transportation and its uncertainty has been a matter that only the elements could control. It is in this competitive field that the plane may find its greatest usefulness and be able to demonstrate its immediate value. A line of seaplanes between Key West and Havana and from there on to other of the West Indies would bring about a development which would have the most interesting possibilities. Costal mails might have in them the secret of success that would enable the post office to expand the service more rapidly than on land. At any rate it holds a promise that should be given an experimental trial.

Trans-Oceanic Trip in Prospect

THE announcement that the Navy is preparing plans to make a trans-oceanic trip thrills every one who looks on the achievement as an event that will rank with the discovery of the Pole. Secretary Daniels has selected Commander Towers to superintend the details of the trip and his selection gives added hope for the success of the experiment. The work he has done during the war in organizing the personnel of the Air Service of the Navy has been largely responsible for the excellent showing made by the naval fliers.

The NC-1 which has made forty or more successful flights and has demonstrated her remarkable airworthy qualities is probably the type that is to be relied on to attempt the trip. Her sister seaplane the NC-2 is now undergoing a tuning up test at Rockaway and gives promise of surpassing the earlier type. There is no question that the Azores are an easy goal for these huge flying boats. With proper preparation at these islands the remainder of the trip could be made without difficulty.

The trip could be made better under the auspices of the United States Navy than any other organization for the conceded reason that any flight will have to start on this side of the water owing to weather conditions, and with the complete equipment that the navy has at its disposal both as to stations and personnel, it will have a distinct advantage. Another factor that will assist in giving the navy a great possibility of success is that it can so route its ships that at a given time, when the trip is expected to be made, many of our naval vessels can be near the lane to be flown over to render assistance in case of failure. This feature will make it possible to take chances which otherwise would not be possible. Every day a new aspirant to the trip comes to the surface in the press both here and abroad. It is to be hoped that the Navy Department will put this project through, as it has so many others in aeronautics, with such skill and efficient preparation that American pilots, designers and constructors may win this prize of the air and arouse in the people of the country a spirit of pride that will be reflected in the appropriations for military and naval aviation for the future.

Junior Military Aviator Ratings

THE announcement that a committee has been appointed to study the question of ratings for pilots who have had exceptional success over the front is welcome news. No feature of the conduct of the A. E. F. in its treatment of Air Service pilots has been so provocative of dissatisfaction than the failure to recognize skill in the air by promotion of Reserve Military Aviators to J. M. A. or M. A.

The law creating these grades is clear on this point. It states that promotion in grade can be made for exceptional conduct in action. For reasons which it is difficult to understand few if any of the R. M. A. pilots received an advance in grade. If the board appointed can give even tardy recognition to the fliers who have actually done the military flying during the war, one of the greatest injustices of the overseas authorities can be corrected.

The whole subject of ratings should be revised. In peace times the increased grade and pay has merit on the grounds of extra hazard but under war conditions the Air Service has proved to be no more dangerous than other branches. Jealousy of the fifty per cent extra pay for the grade of J. M. A. and seventy-five per cent for M. A. has spread throughout other branches of the service, particularly when it is drawn by officers who do very little flying and whose work is essentially administrative. This feeling has made the Air Service a target which has been most evident in the A. E. F. To give these large bonuses to officers who are not on regular flying duty and who have to fly only four hours a month to receive this extra pay, will always create feeling which will make the Air Service plans difficult of completion with officers who believe that other branches of the Service are equally hazardous.

Some new method of giving flying pay should be proposed which will be proportionate to the flying done.

Navy's Story of Aircraft Development

(*Continued from page* 1)

Commander H. C. Richardson, U. S. N., superintending constructor of naval aircraft for the Buffalo district, Airplane and Seaplane Engineering:

The problem confronting the Navy was largely determined at the time the United States entered the war by the fact that the operations of the German and Austrian fleets had been reduced principally to minor raids from the fleet bases at Kiel and Pola, and the only real seagoing operations comprised the activity of submarines.

The work of the seaplanes, therefore, was primarily reduced to that of cooperation with the fleet in reducing the submarine menace. This naturally led to the establishment of coastal stations in France, Italy, England, Scotland and Ireland. In these operations it was possible to operate seaplanes from shore bases in practically every case, and the development of work with the fleet became a minor consideration.

Some of the seaplane bases, however, were sufficiently close to enemy territory to be within raiding distance of enemy planes of both land and water types, and it became necessary for the Navy to extend its activities to the use of land planes for the protection of seaplane bases, while naval aviators also participated in big bombing raids on German and Austrian territory.

I refer to these matters in this general way, not to describe the activities, but to show that in naval work both land and water planes were used, and why the Navy problem was in general restricted to operation from shore bases rather than operation from ships. Activities, however, were not confined to shore bases in Europe. Stations were established on the Atlantic coast, principally for the purpose of submarine patrol and for convoy work from the principal ports from which our troops and supplies were sent abroad.

Types of Planes Developed

The work of seaplanes abroad was that of submarine patrol and convoy work, and this having been determined on, all efforts were made to obtain the most suitable seaplanes for the service. The principal work was done with two types of seaplanes, namely, the HS-2—the single-motored plane developed from the HS-1—and the H-16, a copy of the English seaplane of the same type developed as a result of Commander Porte's experience with the original America and subsequent types developed therefrom. Finally, the F-5-L type was developed from English designs for manufacture in this country by the Naval Aircraft Factory at Philadelphia. The HS-2 and the H-16 have proved well suited to the work required, but the F-5-L did not enter production early enough to get into active service before the armistice was declared.

The Navy did not attempt to develop land plane types, but accepted and used those which had been developed and produced for the Army, adopting for this purpose the English Handley-Page, the Italian Caproni, and the Army DH-4 and DH-9.

In order that pilots should be trained for this service, it was necessary to adopt training planes, and for this purpose the Navy developed and used the Curtiss N-9, the R-6 and the R-9, the Aeromarine and Boeing seaplanes, and the F-boat, and also experimented with a number of miscellaneous types, such as the Gnome scouts—both biplane and triplane of Curtiss and Thomas manufacture—and the Gallaudet D-5. The most successful of these training planes was the N-9, particularly after the original float had been modified and later on after the substitution of the Hispano 130-hp. engine for the OXX 100-hp. engine. This plane was a biplane tractor with a single center float, having wing tip balancing floats. It was remarkably strong and could perform practically all sorts of maneuvers. Although in training work it was frequently wrecked, there were remarkably few deaths resulting. This I attribute to its moderate speed, great strength of construction and tractor arrangement, which made it suitable for training purposes.

As soon as it was determined that seaplanes of the flying-boat type were to be used in service it became necessary to provide preliminary training in a type of seaplane which more nearly represented the conditions of operation of the big boats. For this purpose the F-boat originally developed by Curtiss for sporting and for naval use was modified and adapted to instruction purposes.

So far as the aerodynamical and mechanical features of construction are concerned, seaplanes differ very little from airplanes, the principal difference being the use of the landing gear suited to operation from the surface of the water instead of from the land. The proportions are, naturally, somewhat different, and the performance is different, primarily, because of the greater inertia due to the increased weight involved in the seaplane construction. But bearing this in mind, the details of construction of seaplanes are substantially the same as those used in airplanes.

Factors Affecting Performance

It will now be of interest to consider the principal factors which affect performance, as it is necessary to understand these completely to develop a design which shall perform according to the requirements of the service intended. For the purpose of illustrating the factors involved I have prepared a set of performance curves, which I believe will give a clear insight into this phase of the problem. The complete calculation of the curves shown is given in the Appendix, together with the formulas involved in the computations.

The performance in power flight is determined by the horsepower required and the horsepower available, and, of course, the latter must always exceed the former or power flight is not attainable.

In determining the power required there are two principal factors involved. The first factor is that of the horsepower required to propel the planes with their load in flight. This horsepower I term the plane's e.hp. To determine it, it is necessary to know the form and disposition of the wing surfaces used, as well as the aerodynamic characteristics of the wing section employed. The lifting power of the wing depends on the area and the square of the speed of advance, and its resistance is also in proportion to the area and the square of the speed of advance, the speed of advance being the speed relative to the air itself and not the speed over the ground.

The lift of an airplane surface and its resistance to advance are determined by the lift and drift factors, which vary with the type of section used and also with the angle of attack at which the surface is presented to the relative stream of air. It has been found by experiment that these factors are influenced by the proportion and arrangement of the surfaces, the best results being attained with what is known as the monoplane surface.

Performance is improved by increasing the dimension of the wings in the lateral sense, over that of the fore-and-aft dimension. The ratio of these two dimensions is called the aspect ratio. As the aspect ratio is increased, it is found that the efficiency is improved indefinitely. But after an aspect ratio of 8 or 10 is attained the improvement in efficiency becomes less and less, and, practically, is not worth going after, because the dimensions become unwieldy and the gain in lifting power and efficiency may be more than wiped out, due to the increased weight and resistance of the structure required in employing it. It is largely on account of this difficulty that the biplane and the triplane have been used where large lifting power is required, even though in the latter cases the efficiency of the surfaces is reduced because of interference of the air flow, which is found to depend upon the gap ratio. By this is meant the ratio of the distance between superimposed planes to the chord length, or fore-and-aft dimension of the wings.

Stagger

Where the leading edge of the upper plane is forward of the leading edge of the lower plane the efficiency is improved over that where one plane is immediately above the other, and conversely. This arrangement is referred to as stagger and the condition of positive stagger, that is, with the upper wing forward of the lower wing, is generally adopted with the view of improving efficiency. There are limits to its usefulness because of the obliquity of the trussing involved.

Stagger may be adopted for various reasons, such as correcting the balance of an airplane in which the actual location of the center of gravity does not conform to that originally contemplated, or in order to improve the view of the pilot or observer, particularly if the latter is also a gunner.

The efficiency is improved if the upper plane has a greater lateral dimension than the lower plane. This disposition is known as overhang. There are limits to the extent to which this can be employed, on account of the structural difficulties involved.

In the normal type of construction, the front and rear edges of the wings are parallel, although it is found that tapering the wings to a smaller fore-and-aft dimension at the wing tip improves efficiency. This arrangement is not satisfactory from a manufacturing point of view, as it involves different sized ribs at every station in the wings. All the above considerations have to be taken into account in determining the form and proportion of the wing surfaces.

Another factor is very important, that is the travel of the center of pressure on the wing surfaces. It is found that where wings have a cambered surface—which is usual in airplane construction because of the superior lifting power—the movement of the center of pressure is such as to cause longitudinal instability. Various devices have to be employed to overcome this. The most satisfactory and usual method is to employ an auxiliary surface at the tail of the airplane called the horizontal stabilizer, and the best conditions for stability are found when this rear surface has a smaller angle of attack than the wing surfaces themselves.

The difference of angle between the wings and the horizontal stabilizer is termed "longitudinal dihedral." The

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Harris & Ewing

Lt.-Col. B. F. Castle, Air Service, A.

Few officers of the D. M. A. have been in as close touch with the problems of Military Aeronautics in this country as Lieut. Col. Castle. His duty in Washington since July, 1918, on the Control Board has enabled him to render valuable assistance in shaping the policy of the division. His military career has been as follows:

Graduated U. S. Military Academy, West Point, N. Y., in 1907. Assigned to the 29th Infantry and served with that regiment in the Philippines and Fort Porter, N. Y., until August, 1912. Assigned to duty at the U. S. Military Academy as an instructor September, 1912. Promoted to 1st Lieutenant, February, 1913. Assigned to duty with the 15th Infantry at Tientsin, China, November, 1914. Promoted to Captain, September, 1916.

Detailed to Aviation Section, Signal Corps, with grade of Major, August, 1917. Assigned to duty with Construction Division, Signal Corps, Washington, D. C. Assigned to duty at Rockwell Field, San Diego, Cal., March, 1918, and received J. M. A. rating at that place June 13, 1918. Assigned to duty as member of Control Board, Division of Military Aeronautics, Washington, D. C., July, 1918. Promoted to Lieut. Colonel, Air Service, August, 1918. Lieut. Colonel Castle's home is Milwaukee, Wis.

stiffness or steadiness of an airplane in flight depends on the area, proportion, section and angle of the rear surface. Where great stiffness is desired, this rear surface may even assume the proportions of a second set of lifting surfaces which may be of monoplane or biplane arrangement, usually of smaller dimensions than the main planes. Where the rear surfaces are increased to nearly the proportions of the forward surfaces, the tandem biplane arrangement is approached. . . .

Location of Powerplant and Crew

Having given due consideration to the influence of the proportion, arrangement and disposition of the main supporting and control surfaces, it is next necessary to consider the service intended and the location of the powerplant and the crew. The possible arrangements are almost infinite, but in general it is desirable to locate the pilot centrally where he will have a proper view to enable him to handle the airplane to the greatest advantage and this is particularly necessary in the combat plane. It is also essential that the gunner shall have as large and unobstructed a view as practicable, and that with the gun positions selected he shall be able to cover his arc of fire as much of the surrounding sphere as is practicable, in order that there shall be no dead spots from which the enemy may approach without his being able to return the fire. This sometimes requires that the pilot himself shall be able to operate guns firing dead-ahead, or that additional gunners shall be placed so that they can cover arcs of fire not possible for the others to cover.

In bombing planes and, in particular, in night bombing ones, this requirement is of less importance, and the requirement that the bomb dropper shall have a proper view for the operation of the bomb sights becomes of prime importance.

In airplanes designed for long-distance flights or for bombing, it becomes necessary to have great power available and this requirement has led to the adoption of multiple unit powerplants. Two, three, and as many as five powerplants have been successfully used for this purpose. The multiple-engine plane has the advantage that in case of damage to one powerplant it is usually possible to continue flight with those remaining; or, if still too heavily loaded to accomplish this, it is possible to glide for a long distance and thereby select a more favorable landing place, and often to avoid landing on enemy territory.

All these and many other considerations enter into the disposition and arrangement of the powerplant and fuselages, and these arrangements themselves have an influence on the performance of the wing surfaces because of interferences involved.

By winging out the powerplants a more favorable load distribution is imposed on the airplane structure and advantage is taken of this feature in designing the wing trussing. The effects of interferences and of the disposition and proportion of the wings or bodies and auxiliary surfaces are so complex that unless data are already available from similar designs, it is very desirable that the resistance and lifting power of the complete design should be determined from wind-tunnel tests of a model carefully constructed to scale in every detail. Such model test is usually deferred until the design has approached some definite form after preliminary estimates have shown that it is capable of approaching the performance desired.

Form and Proportion of Wings

In preliminary estimates the influence of the form and proportion of the wings is carefully estimated, and from these estimates a fairly accurate approximation of the horsepower required for the planes is derived. To arrive at the total horsepower required, it is next necessary to consider the horsepower required to overcome the head resistance. In order to do so, it is necessary to have accurate knowledge of the resistance of all elements of the airplane structure exclusive of the wings, which are exposed to the action of the wind in flight.

Alexander Klemin

Alexander Klemin was formerly in charge of the Aerodynamical Laboratory and of Instruction in Aeronautical Engineering at the Massachusetts Institute of Technology, and acted as consulting engineer to a number of prominent airplane companies. While in service—first as an enlisted man and then as a Second Lieutenant—Mr. Klemin was in charge of the Aeronautical Research Department, Aeroplane Engineering Division, U. S. A., at McCook Field; and was responsible for a great deal of experimental design and testing. He is the author of a text book of Aeronautical Engineering and Aeroplane Design, and numerous articles and reports. He is resuming his former work as Technical Editor of *Aviation and Engineering* and the AIR SERVICE JOURNAL, and will resume his practice as a consulting aeronautical engineer.

To reduce the resistance of these elements to a minimum, streamline forms are adopted wherever practicable, and even the truss wiring is made up of streamline form; or, if this is not found practicable these wires are covered with false streamline covers of wood or metal. It is found that the reduction in resistance more than compensates for the additional weight involved in applying these false covers.

The resistance of the fuselages, radiators, engines, tail control surfaces, elevator rudder, aileron horns and all other elements is computed in detail, and account is also taken of the obliquity of these elements to the flow of the air. Such obliquity is found to exert an important influence on their action. For preliminary estimates, it is customary to determine the resistance of these elements for the position assumed by them at some speed intermediate to the low flying speed and to the high speed attainable with full power, and then to assume that the resistance of these elements is proportional to the square of the speed for speeds above and below the intermediate speeds selected. This is most handily done by assuming that the resistance of these elements is represented by a flat surface exposed normal to the wind, which would have the same resistance as the aggregate of these elements. This suppositious surface is what is referred to when we speak of the "surface of equivalent head resistance." In the example which I have chosen to illustrate, "the equivalent head resistance" is assumed to be 20 sq. ft., and the horsepower required to drive this head resistance through the air is indicated on the curve denoted head resistance horsepower. By compounding the ordinates of this curve with the ordinates of the plane's e.hp. curve we derive the total e.hp. required curve.

We have next to determine the total brake horsepower available in order to determine the performance of the airplane. To determine this curve, we must first know the full-throttle characteristic of the engines to be used. This characteristic is indicated in the example showing the brake horsepower available at different speeds.

The next thing to be determined, and the one having a most important influence on the performance of the airplane, is the propeller characteristic. To date the progress in propeller design has been far from satisfactory, and although good results have been obtained, the best results possible have seldom been approached. In the selection of the propeller, one of the first considerations is to determine what feature of performance is most important, for it is necessary to select the proper dimensions with a view to gaining the best results for the service intended. For instance, if high speed is of greatest importance, the propeller to be selected will differ materially from that which would be required if great climbing power is desired, because the greatest climbing power will be attained at a speed much lower than the maximum rate. Or, it may be a question of selecting a propeller which will give the greatest efficiency at cruising sped, and this propeller will usually differ from that selected in either of the preceding cases. In some cases it may be desirable to select a propeller which will give the best all-round performance rather than for a particular condition.

In seaplane work a problem arises which is not found in the land airplanes. This problem is that of obtaining the greatest reserve of power to overcome the resistance of the float system, because it is desirable to have the greatest possible reserve to accelerate rapidly on the water, so that the get away may be made in rough water with the greatest possible rapidity, thereby reducing the punishment which the seaplane suffers under such conditions. For a heavily loaded seaplane this consideration may be of vital importance.

Efficiency of the Propeller

It must be understood that the efficiency of an airplane propeller is absolutely dependent upon its speed of advance through the air, as is also the power which the propeller absorbs in flight, the result being that even though the full throttle is used the engine cannot make its full revolutions until a good flying speed is attained, with the consequence that full power of the motor cannot be realized until flying speed is attained. . . .

Design of Seaplane Floats

I will now proceed to the consideration of some of the elements of design of seaplane floats. The requirements of seaplane floats, because of the nature of their use, are necessarily conflicting, and the best that can be done is to make a compromise, bearing these in mind.

The first requirement of a float is that it shall be seaworthy. This requires that the form shall be properly proportioned to provide good initial stability and a reserve of buoyancy. This is necessary to obtain a reserve of stability, as the seaplane must float without capsizing in a sea-way and in strong winds. This requirement in itself conflicts with airworthiness and lightness and with the adoption of the best streamline form, which otherwise would be, in general, a form similar to a dirigible. It must be strong, but this naturally conflicts with lightness. It must also have good planing qualities, and this requirement conflicts with streamline form. Airworthiness requires that it should have the minimum resistance and interfere in the least possible degree with the other characteristics of the seaplane.

In order to develop the best form of hull, the Navy Department began experiments at the Washington model basin late in 1911. These experiments were initiated by Capt. W. I. Chambers, U. S. N., with a view to the use of hydroplane blades, such as had been used by Forlanini, and to improving the planing qualities of the then existing types of floats. At that time the most successful float was that constructed by Glenn H. Curtiss, having a simple box section and a sled-form-profile. At the same time Burgess had developed twin floats having a single step, which had also proved successful. . . .

The V-Bottom versus the Flat

Experiments have recently been made at the model basin on a series of models having different angles of V-bottom from the flat bottom up to a 20-deg. V, and it is found that from a resistance point of view there is very little difference in the performance of the four models tried. So far as any advantage is shown, the deep-angle V has slightly the best of the argument. From a service point of view the deep V-bottom has many advantages; among them its remarkable shock-absorbing properties in taking care of bad landings, or in getting away and landing on a rough sea. The V-Bottom also permits landing across the wind without serious retardation and without danger of capsizing sideways. This type of hull appears to absorb the shock by penetration and reduces the loads imposed on the bottom planking and on the framing supporting this. Due to this feature there is no need of carrying shock absorbers between the floats and the rest of the plane structure, and the lightest possible construction can be adopted.

The first hulls built in this country had an elaborate framework of ribs and longitudinals supporting the bottom

Harris & Ewing

Col. Arthur Woods, A. S., A.

Col. Arthur Woods, formerly Police Commissioner of New York city, has received his honorable discharge from the Army, having served during the latter part of his service as Assistant Director of Military Aeronautics.

planking, which afforded a regular network having hundreds of intersections requiring fastening, the fastenings themselves weakening the frames and the longitudinals at the point where the frames carried concentrated loads on small areas of side grain. This type of construction was unnecessarily heavy and costly and was early abandoned in the construction of pontoons of navy design in favor of the longitudinal system of support.

In the longitudinal system of support the inner ply of planking is run athwartship and thereby constitutes a continuous system of ribs. This system is further reinforced by the outer planking run 45 deg. to the keel, which also acts as a continuous system of ribs, and these two systems transmit the water pressure as a distributed loading to the longitudinal members, which do not have their strength robbed by a series of notches. The longitudiuals are arranged so that they collect the distributed load and concentrate it at points of support in athwartship bulkheads and these bulkheads in turn distribute the load to the keel, to the chine stringers, and to the deck planking. The keel itself is usually associated with a center longitudinal truss. Through these members the load is finally distributed to struts or directly to the wing structure.

On a large scale this system is adopted in the construction of the hull of the NC-1 which, although it embodies other features than those necessary to support the bottom planking, weighs only 2600 lb. while it carries a load of 22,000 lb. This hull has demonstrated ample strength in landing on and getting off an 8-ft. cross sea in practicaly dead air, where the landing and get away were both made under the hardest conditions.

A controversy has existed for years as to the merits of the single float as compared with the twin float, but, based on the experience of our Navy with examples of both types, I believe that the central float with wing tip balancing floats is decidedly the better arrangement. In the central float system the loads can be concentrated on the point of support, whereas in the twin-float system the loads are usually concentrated in the center of the span and the wing structure has to be utilized to gain the necessary stiffness and necessarily has to be made heavier. In the center-float type if a single propeller is used it is located above the float and protected from the water, whereas in the twin-float type such propeller necessarily swings over the gap between the floats, which subjects it to punishment by spray and broken water. In landing a twin-float seaplane, unless both floats arrive at the same time, the second float invariably strikes harder than the first, being slammed down on the water. Due to the greater lateral stiffness of the twin-float system, when getting off rough water the seaplane is forced to conform in its attitude to the form of the surface and wracks and lurches violently sideways unless going directly across the crest of the sea. In maneuvering in the air, also, the separation of the twin floats adds considerably to the inertia about the longitudinal axis and makes the action of the ailerons less effective. With twin floats, when the taxiing across a strong side wind the lee float must have at least 100 per cent reserve buoyancy, and this leads to greater weight than is necessary with the single center-float providing the same stability.

Types of Navy Planes

As above referred to, the principal types of service planes used by the Navy were the HS-2, H-16 and F-5. Your attention is invited to the illustrations of these.

The HS-2 was developed from an original twin-motored seaplane designed for the Army, which, however, did not prove successful. It was originally intended to be used with two 100-hp. engines. Later, when the Navy took hold of it, the Curtiss VX3, a 200-hp. engine was used, and this seaplane gave a fairly satisfactory performance with this powerplant. At about the same time the Liberty engine became available, and as soon as it was instaled it was found that this performance was very much improved and this seaplane was capable of flying at a total weight of about 5900 lb. On this basis it was then attempted to convert it into a military machine by providing the necessary guns, bombs and other equipment. After everything had been added, it was found impracticable to carry the military load desired on a limit of 5900 lb. total weight. The expedient was therefore adopted of adding wing surface, and the original HS-1 thus became the HS-2, capable of carrying a load of 6500 lb. with practically no reduction in full speed and with considerable increase in climbing power. Many forced landings have been made at sea; some due to powerplant difficulties, such as stoppage of fuel supply, or failure of the engine or propeller, and sometimes due to head winds forcing a landing on a return trip on account of exhaustion of fuel. Although many of these landings were made under bad weather conditions and in rough seas. in nearly every case landings were accomplished without serious damage to the hull.

The general arrangement of this seaplane is indicated in the illustration. The pilot and assistant pilot are seated in a cockpit just forward of the wings, from which point they have a good view for the operating of the seaplane. A radio outfit is provided just forward of the pilot. A gunner's cockpit is fitted in the bow, and this cockpit is provided with a gun ring and Lewis gun. This gunner has a very good range of fire, particularly ahead and down and on either beam; also upward and to the rear above the planes. But there are no means of firing abaft the beam, and the boat is unprotected against attack from the rear. In the gunner's cockpit are also fitted the bomb pulls and the sight for dropping the bombs, which are located under the wings just clear of the hull. On account of its undefended condition against attack from the rear, this seaplane was not used in sectors where it would be exposed to attacks by enemy aircraft, but there were many places abroad—and, of course, in this country—where no such attack was probable and where it proved particularly useful in submarine patrol and convoy work. This seaplane is also used for instruction purposes as an advance step toward handling the regular twin-motored seaplanes. The HS-2 is provided with a single Liberty engine and a pusher propeller, and has very satisfactory air maneuvering qualities.

The H-16, as you will see, was a twin-engined seaplane with a flying-boat hull, using tractor propellers. The pilot and observer are seated in a cockpit about half-way between the bow and the wings, where they have an excellent view. The H-16 was also fitted with a gunner's cockpit the same as the HS-2. In addition, a wireless operator was carried inside the hull just forward of the wings and back of the pilots. Abaft the wings an additional gun ring was fitted covering the arc of fire above and between the wings and the tail controls and to take care of the region to the rear and below the tail controls; gun mounts were also fitted, swinging on brackets through side doors in the hull. The bomb gear was operated from the forward gunner's cockpit and four bombs were carried, two under either wing. This type of boat proved very serviceable, and was a substantial copy of the same type of boat built in this country for England, differing only in minor details from those supplied to England. This boat was really a successor to the H-12, which was very similar, except that the hull of the H-12 was more like that of the HS-2, both in construction and in the form of the planing fins.

As you will note, the F-5 is very similar to the H-16, being approximately 10 per cent larger than the H-16. In addition to this increase in dimensions, which was made to afford a greater military load, it will be noted that this seaplane has balanced wing tip ailerons and also a balanced rudder. The hull form is practically identical with that of the H-16. The principal data of all three of these boats will be found in the Appendix.

A little over a year ago the Navy Department decided to build a large seaplane equipped with three Liberty engines and, after consultation, a contract was entered into with the Curtiss Aeroplane & Motor Corporation and a design was developed, under the supervision of representatives of the Navy Department, first at the Austin Street plant of the Curtiss corporation in Buffalo and later at the Garden City plant of that company. As a result, the NC-1 was developed and built and has recently undergone trials at Rockaway Beach.

Commander Coburn's Address

Commander F. G. Coburn, manager Naval Aircraft Factory, Construction Corps, U. S. N.—Problems of the Naval Aircraft Factory During the War:

The reason for the establishment of the naval aircraft factory was the problem of aircraft supply which faced the Navy Department upon the entrance of the United States into the great world war. It is unnecessary to recite these conditions to the members of this society. It suffices to say that the army's requirements for large numbers of planes promoted a decided lack of interest in the navy's requirements for comparatively small numbers of machines, and the Navy Department therefore concluded that it was necessary to build and put into production an aircraft factory to be owned by the navy, in order, first, to assure a part, at least, of its aircraft supply; second, to obtain cost data for the Department's guidance in its dealings with private manufacturers; third, to have under its own control a factory capable of producing experimental work.

Appointment of an Investigating Board

The Department directed that a survey of the situation be made early in June, 1917, with a report upon the size, cost, and location of a factory capable of producing 1000 navy school planes, known as Curtiss N-9, per annum, and further to report upon the minimum time in which such a plant could be built, equipped, manned and put into operation. The field for investigation was necessarily limited, as at that time only the Churchill street plant of the Curtiss Aeroplane Company could be considered a manufacturing plant for airplanes. There were a number of other firms producing planes in small quantities or getting ready to produce them in large quantities. But scanty information was therefore available and there was no time to make an exhaustive study that under ordinary peace-time conditions would be expected before embarking on an enterprise of this size. Consequently about the middle of July, 1917, it was reported to the Chief of the Bureau of Construction and Repair, Admiral D. W. Taylor, U. S. N., and to the Secretary of the Navy, that a plant of the required size could be built at the League Island Navy Yard at a cost of approximately $1,000,000 in about 100 days.

On July 27, 1917, the Secretary of the Navy approved the project and directed the Chief of the Bureau of Construction and Repair to proceed with the construction.

Building Contracts Awarded

The contract for the buildings was awarded Aug. 6, 1917, ground actually being broken four days later. Beneficial occupancy of part of the building was obtained about Oct. 1, 1917, ahead of the time promised by the contractor. On Oct. 16, 1917, sixty-seven days, after breaking ground, the first power-driven machine was put in operation and the entire building was pronounced complete Nov. 28, 1917.

Aeronautical Experts at McCook Field

STANDING, LEFT TO RIGHT—FRANK CALDWELL, O. H. SKINNER, F. R. PORTER, CAPTAIN BLEE, MR. WAHL, MR. ROCHE, LIEUT.-COL. J. G. VINCENT, LIEUT.-COL. H. C. MARMON, CAPT. BLOOD, MR. SPRUG, MR. SIMMONS, MR. RIEHLE, CAPT. PHILIP WYMAN, MR. MOON, MR. PETERS, LIEUTENANT SPENCER AND CAPTAIN WOOLSON. SEATED, LEFT TO RIGHT—R. A. LOOMIS, LIEUTENANT MCMAHON, CALEB BRAGG, SERGT. ALEXANDER KLEMIN, G. L. MCCAIN, MR. LARKIN AND E. L. NELSON.

The engineering data and plans for the planes to be built were received by the factory Oct. 26, 1917, and on March 27. 1918, 228 days after ground was broken and 151 days after receipt of the plans, the first machine was given its first flight, which was successful, and on April 2, 1918, this machine and the second one were shipped from the factory en route to England. These two boats were the first of the original manufacturing order, which was completed July [illegible], 1918, ahead of the time scheduled for its completion.

Some figures obtained as of Sept. 30, 1918, about a month and a half before the armistice was signed, will give an idea of the size of the factory at that time. It has been enlarged beyond the bounds of the original project, as will be hereinafter described.

Total floor space, sq. ft.	750,000
Total ground covered, including lumber yards, acres	41
Total number of employes	3,000
Of which were women.	750
Value of plant, buildings, and equipment	$1,476,000
Supplies in store	1,621,000
Work in process	1,662,000
Total inventory	$7,759,000
Value of output:	
(a) 183 twin-engined flying boats (at approximately $20,000 each)	$3,660,000
(b) 4 experimental machines, 50 sets twin-engined flying boat spares and a considerable volume of ordinary experimental and repair work	200,000
Total value of output	$3,860,000
Payroll for month of September, 1918	405,000
Total expended in wages up to Oct. 1, 1918	$2,790,000

The Original Plant

The original plant consisted of a building 400 ft. square containing a balanced plane factory—that is, mill, metal shop, panel shop, covering, varnish, and dope rooms, hull shop and final assembly, together with the general offices, toilet and locker rooms, cafeterias, and storeroom. In addition there was a four-cell Tiemann dry kiln, a brick building 60 by 100 ft., heated, for the storage of kiln-dried lumber, a lumber yard with modern pile bottoms for the accommodation of approximately 3,000,000 ft. of lumber, and a boiler house.

Fig. 6 gives the layout of the entire factory buildings, Nos. 1 and 2, constituting the original project, the block to the south of the main building, No. 5 being the lumber yard. The large building is made up of a section 300 by 400 ft. of the Austin Co. No. 3 building, and a special bay 100 by 400 ft. was added to supply hull building and final assembly space. This extra bay was 100 ft. wide with a clearance under the roof trusses of 51 ft., accommodating a 10-ton, three-motor, overhead traveling electric crane with a 40-ft. hook hoist. The provision of this high, wide, long bay seemed to many to be of doubtful value, but it was intended to meet the requirements of the future, which it seemed certain would be for large planes, and as it happened the factory never went into production on small planes, but was started at once on large planes, making this building and its crane a paying investment from the start.

Layout Assured Flexibility

The allocation of space to the various activities of the plant was a problem which did not at the time admit of definite solution because of lack of definite information as to the types of machine to be built and of information as to the amount of space actually required for known types of machines. The only partitions erected, therefore, were those necessary to meet the following requirements: First, to separate the high bay from the low part of the building, as a fire protection measure; second, to separate the offices, toilet and locker rooms and cafeteria from the factory for fire protection, cleanliness and quiet; third, to enclose the metal shop, and the varnish and dope room, as a matter of fire protection.

The machinery purchased was equipped with individual motors so that no provision for line shafting was necessary and the location of the machines could be changed at pleasure.

Atmospheric Conditions Stabilized

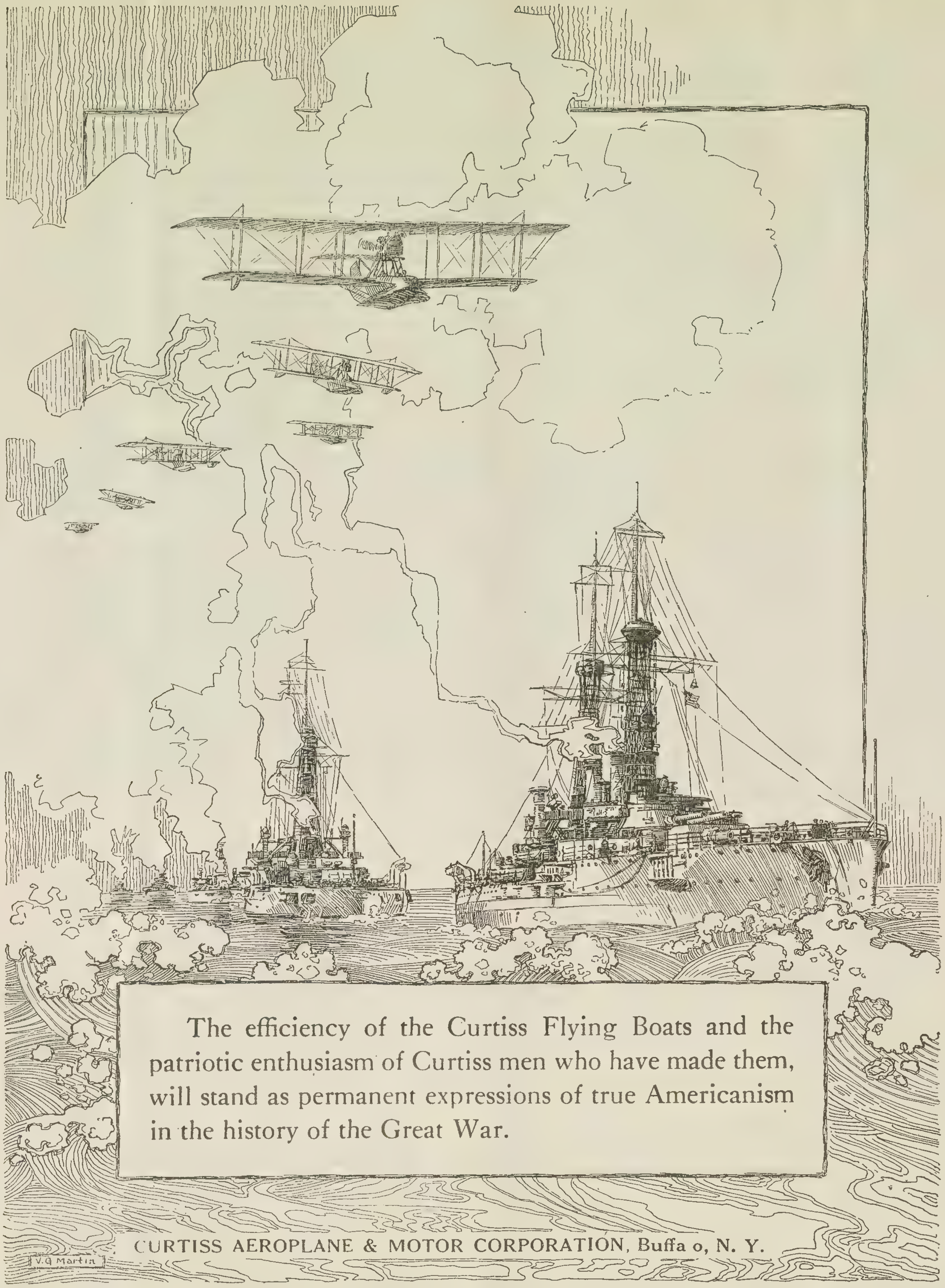
Having noted that a watering-pot was necessary to preserve the necessary humidity in airplane factories and realizing the desirability of standardized and constant atmospheric conditions as to temperature, humidity, and ventilation, the Carier system of heating, humidifying and ventilating was installed. This is the system now being commonly used in cotton mills and was introduced into an airplane factory for the first time. It has automatic temperature and humidity control, the air condition being standardized at that which would provide a good working temperature (65 deg. Fahr.), together with a 50 per cent humidity, which would insure that wood dried to 10 per cent moisture content would neither absorb nor give off moisture. It was then insured that small and particularly thin wood parts would maintain their size and shape after manufacture and thus facilitate assembling. The system proved most satisfactory.

Probably all plane manufacturers in the aircraft world went through the same distressing times experienced by the naval aircraft factory of having to start work as winter approached in incomplete buildings without light and without heat, and without those conveniences and articles of equipment that are not appreciated by those who work in established factories.

Problems of Enlargement

In December, 1917, it was decided by

(Continued on page 10)



The efficiency of the Curtiss Flying Boats and the patriotic enthusiasm of Curtiss men who have made them, will stand as permanent expressions of true Americanism in the history of the Great War.

CURTISS AEROPLANE & MOTOR CORPORATION, Buffalo, N. Y.

BOMBING OF GERMANY BY GREAT BRITAIN

Excerpts from the Report of General Sir Hugh M. Trenchard

MANNHEIM WORKS ATTACK

Cooperation with the American First Army in Its Great Offensive on the St. Mihiel Salient

Major-Gen. Sir Hugh M. Trenchard, commanding the Independent Force, Royal Air Force, has made a report to the Secretary of State for the Royal Air Force on the work of the Independent Force from June 5 to Nov. 11, 1918. This force was organized solely for the purpose of bombing the industrial centres of Germany, and command of the whole of the British effort in this direction was placed in the hands of General Trenchard.

Following are excerpts from the report:

From Oct. 11, 1917, to June 5, 1918, this small force had, in spite of a very severe winter, carried out no fewer than 142 raids. Fifty-seven of these raids were made in Germany, and included night and day attacks on Cologne, Stuttgart, Mannheim, Mainz and Coblenz. Long-distance raids had also been carried out against Namur, Charleroi and Liege, in order ta help in attacking the enemy's communication to the Western front. * * * *

The question I had to decide was how to use this force in order to achieve the object, *i. e.*, the breakdown of the German Army in Germany, its Government, and the crippling of its sources of supply.

The two main alternative schemes were:

1. A sustained and continuous attack on one large centre after another until each centre was destroyed and the industrial population largely dispersed to other towns, or

2. To attack as many of the large industrial centres as was possible to reach with the machines at my disposal.

I decided on the latter plan. * * * *

Below are a few interesting figures: The total weight of bombs dropped between June 6 and Nov. 10 was 550 tons, of which 160 tons were dropped by day and 300 tons by night. Of this amount no less than 220¼ tons were dropped on aerodromes. This large percentage was due to the necessity of preventing the enemy's bombing machines attacking our aerodromes, and in order to destroy large numbers of the enemy's scouts on their aerodromes, as it was impracticable to deal with them on equal terms in the air. * * * *

It must also be remembered that of the 109 machines which were missing the majority dropped bombs on targets before landing. The amount of bombs dropped by these machines is not included in the above figures. * * * *

In June the longest distance flown out and back by day was 272 miles, and by night 240 miles. In July the longest distance flown out and back by day was 272 miles, and by night 300 miles. In August the longest distance flown out and back by day was 330 miles, and by night 342 miles. In September the longest distance flown out and back by day was 320 miles, and by night 320 miles. In October the longest distance flown out and back by day was 320 miles, and by night 272 miles. * * * *

A large amount of photographic reconnaissance was done by individual machines at a great height. This work was nearly always successfully carried out, and only one photographic machine was lost during the whole period of operations. * * * *

Photographs have proved time and again the efficiency of the work of the bombing machines. Captured correspondence testified to the great moral effect of the bombing attacks on Germany. * * * *

Ceiling was of moree importance than speed for long-distance day bombing work. It was essential that squadrons should fly as high as possible, and it soon became apparent, as I had already stated, that the two squadrons with the 200-h.p. B.H.P. engines had not sufficient power for this long-distance work. One squadron was re-equipped with D.H.9a machines with Liberty engines in November before the signing of the armistice, and the second squadron had started re-equipping. * * * *

The twenty-seventh group was established in England under the command of Col. R. H. Mulock, D.S.O., for the purpose of bombing Berlin and other centres. This group only received the machines capable of carrying out this work at the end of October, and though all ranks worked day and night in order to get the machines ready for the attack on Berlin they were only completed three days before the signing of the armistice. * * * *

On the night of Aug. 25-26 two machines of No. 215 Squadron made their first attack on the Badische Anilin Soda Fabrik Works at Mannheim.

The two machines, piloted by Captain Lawson and Lieutenant Purvis, left at eight o'clock. One pilot shut off his engine at 5,000 feet and glided in on the target from the worthwest, following the river. He was at once picked up and held in the beams of the searchlights and an intense anti-aircraft barrage was put up. The machine continually changed its course but could not shake off the searchlight, and the pilot was completely blinded by the glare. At this moment the second machine glided in, with its engine almost stopped, underneath the first machine, got immediately over the works, below the tops of the factory chimneys, and released its bombs right into the works. The searchlights at once turned on to this machine, freeing the first machine from their glare. This machine then turned and made straight for the works as low as the second machine among the chimneys and released its bombs. The searchlights were turned almost horizontally to the ground and the anti-aircraft guns were firing right across the works and factories almost horizontally. In spite of this the two machines remained at a low altitude and swept the factories, works, guns and searchlight with machine-gun fire. On the return journey both of these machines passed through rain and thick clouds, while lightning and thunder were prevalent throughout the trip.* * * *

The independent force, at the request of Marshal Foch, co-operated with the American First Army in its attack on the St. Mihiel salient, and it further co-operated with the army by attacking important railway junctions behind the French lines in the combined offensive of Sept. 26.

Senators and the Air Mail Service

On Feb. 1 the United States Senate resumed consideration of the bill (H. R. 13,308) making appropiations for the service of the Post Office Department for the fiscal year ending June 30, 1920. The following excerpts from the debate relating to the establishment of the Air Mail Service will be found enlightening:

Mr. Weeks. Now, we have come to a new proposition in connection with the postal establishment, that relating to the carrying of mails in the air, and, in my judgment, it is a promising undertaking.

That service was not satisfactory, Mr. President, in the experiment that was made last year. There was a loss somewhat larger than has been quoted on the floor; I am not sure that those carrying on that experiment know exactly what the loss is. I think the returns are to some degree experimental, as is the service. By establishing routes for long distances, it seems to me, it is almost conclusive that at a proper rate charged for the service a return can be made which will benefit the business and professional men of this country. I do not want to stop in this new undertaking until we have given it a thorough investigation. I think that almost everyone will admit that the airplane, which has been a great military accomplishment, may become as great in industrial and other ways. Indeed, if we had been as wise as was the Government of Great Britain, we would months and almost years ago have undertaken experiments relating to this service and relating to every other kind of service which may be used after the war. They appointed, as everyone knows, I think, committees to investigate the conditions surrounding every kind of industry; the airplane service was one of the matters which they, as early as the beginning of 1917, brought to the attention of the Parliament; and that was included in the general scheme to make recommendations for conditions after the war.

I have in my hand the final report made by the committee on the airplane service. There was an interim report, even more voluminous than this. The members of the commission included officers of the army and navy, several men of high rank in the Parliament of Great Britain, and many men who were more or less familiar with the industrial phase of this question. I want to take the time to read an extract from this report, because it will indicate to the Senate what is being done in Great Britain to prepare for what was the inevitable and what has come to pass in regard to such matters as the airplane service.

That simply indicates, Mr. President, what has been done by those with whom we are going to be brought in rivalry in the conduct of the affairs of the world now and in the immediate future, and I think, as this is the only place where we are making any experiments relating to aircraft service, that we can ill afford to fail to adopt the recommendation by the committee.

Mr. Jones of Washington: I think there should be special attention given to the development of this service, not only as a military arm of the Government but also as a commercial or business proposition. The availability of the airplane for these various lines of activity is beyond the experimental stage: there cannot now be any question about that. Our activities should be along the line of developing the airplane for special purposes and special uses.

In considering the practicability of using the airplanes of the Military Establishment for the Postal Service I think we should not overlook the fact that our activities and energies during the last two, three, or four years in airplane development have all been directed along war lines. Airplanes have been developed with the special object and purpose of making them available as military machines and military instruments. I can see that this would lead to the development of machines that might not really be very serviceable in connection with the activities the Post Office Department must carry on. So it seems to me that, until we get this central body, this central organization, the Post Office Department should be encouraged and aided in experimenting along the line of developing an airplane, an "airship" as they call it, that will be especially suitable for the carrying of mail rather than for high flights and doing special "stunts," as they are called, in the air, and all that sort of thing. I can see reasons for the construction of a machine in a different way, especially the body of it, for carrying mail than for carrying a man up in the air whose duty and business it is to find somebody else and try to overthrow him.

HELICOPTER TYPE OF PLANE STABILIZER

Engineer John P. Tarbox Talks of the One Tested Abroad

SOMETHING LIKE IT COMING

It Must Be, However, One Possessing the Maximum of Aerodynamic and Mechanical Efficiency

Airplane stabilizers are needed and will be produced soon in such form as to make airplanes of great commercial value, according to John P. Tarbox, executive engineer of the Curtiss Engineering Corporation of Garden City, and chairman of the patents committee of the Manufacturers' Aircraft Association.

Mr. Tarbox in discussing the report printed in the New York *Sun* last Wednesday concerning a stabilizer of revolutionary promise tested out in secret at the recent interallied aviation meet in France said that the device described appeared to be of the helicopter type. The chief feature of the stabilizer is a great propeller revolving horizontally above the upper wing, holding the airplane stationary in the air, acording to stories told by aviators arriving from abroad.

"It would seem that such a device could scarcely hope for general application to airplanes by reason of what would appear to be its cumbersomeness and the resultant lowering of the aerodynamic efficiency of the airplane," Mr. Tarbox said. "Airplane stabilizers are needed, and their production in commercial form will likely go far toward advancing the commercial use of the airplane. It is safe to say that within a very short time such devices will be available for application to machines in commerce and sport as well as for the larger bombing and fighting machines which must carry heavy loads and travel long distances.

"The final type adopted it is believed will be something which possesses the very maximum of aerodynamic and mechanical efficiency and which is able to meet fully all of those subtle and suddenly changing conditions which beset the airplane in gusty air. If the helicopter accomplishes this it will be a great surprise to the engineering world."

Divisional Insignia and Its Use

By order of the Secretary of War, officers and enlisted men returning from France as casuals for the purpose of discharge, will be permitted to wear insignia indicating the tactical division, Army Corps or Army with which they served overseas. This applies not only to those who are to be immediately discharged but also to those retained in hospitals pending discharge.

Officers and enlisted men returning as casuals not for discharge but for active duty in this country will be required to remove such insignia.

Units returning from overseas for the purpose of demobilization will be permitted to wear divisional, Army Corps or Army insignia until demobilized. Units returned for station in this country, which are not to be demobilized, will be required to remove such insignia.

Defines Regular and Frequent Flights

Existing orders interpret "regular and frequent participation in aerial flights" as not less than four flights per month for a total of at least four hours. All officers signing pay vouchers covering flying pay will add the words "embracing not less than four flights per month for a total of at least four hours."

Navy's Story of Aircraft Development

(*Continued from page 7*)

the Navy Department to make a very great increase in the aircraft building program to meet the requirements for planes for patrol and convoy work in the North Sea and particularly over the waters contiguous to the coasts of Ireland and France. Although at this time the naval aircraft factory was not yet in production, its original plant was complete, the organization was formed and working, a fair start had been made on the assemblage of a working force, and it gave promise of coming satisfactorily into production. The new program necessitated the provision of additional manufacturing facilities because the army was not prepared to release any of the facilities assigned to it by the aircraft board.

The first problem was to decide whether or not to construct a balanced factory to supply the needed capacity. After considerable discusion it was decided that the time required for the erection of the building, the assembling of sufficient personnel, etc., was so great as to preclude so doing. It seemed better to utilize idle plants in the industrial world for the production of parts and to erect as an enlargement of the naval aircraft factory an assembling plant to be fed by these sources of parts and minor assemblies.

For this there was provided a building shown in Fig. 6, consisting of two parts: a low building 13 ft. under the roof trusses was provided for panel shop, varnish and dope room, pontoon manufacture, etc., and a bay 100 ft. wide, 51 ft. under the trusses and 680 ft. long for final assembly, flanked on each side by a bay of equal size, 50 ft. wide and 30 ft. under the trusses. The 100-ft. bay was equipped with two 10-ton, three-motor, overhead traveling electric cranes, and the side bays each with a 2½-ton small crane. The plan was to manufacture and assemble wings, pontoons, and similar parts in the low section, assembling them to jigs and packing them for shipment, the boat hulls to be put through final assembly, packed and shipped from the high bay, while the flanking bays were used for sub-assembling.

Outside Plants Aided Increased Production

As sources for hulls some six yacht building yards were obtained, and for the supply of wings, metal arts, tanks, engine foundation assemblies, tail surfaces, etc., the services of a number of plants were enlisted which might have otherwise stood idle due to the discontinuance of their peace time business.

The direction of the entire program was reposed in the central offices of the naval aircraft factory, which necessitated enlarged office space. Therefore, a concrete three-story office building was erected to accommodate the offices and the old office space was put into production. A six-story concrete storehouse, approximately 200 ft. square, was provided to meet the enlarged storage space requirements and the storage room in the original factory was thrown into production space. The dry kiln capacity was doubled, as was also the heated storage building and the lumber yards. The success of the Carrier heating and ventilating system in the original plant dictated its installation in the new assembling plant and in the heated lumber storage building.

At this time there was also projected a hangar which was authorized in the spring of 1918 and is now under construction, because of the increase in experimental work, in the development of new models and of new features in old models, necessitating a considerable amount of alteration on completed planes and test and demonstration flying. The Delaware River affords ample space and climatic conditions are favorable, except for two months in the winter.

This hangar has a door 200 ft. wide and 50 ft. high, and the building itself is 150 ft. deep. In front of this hangar is an apron 100 by 200 ft. made of concrete with a concrete ramp flanked by concrete piers. The concrete is to be colored green to relieve the glare. Provisions are made for the simplification of handling planes on the apron and ramp.

The Philadelphia Navy Yard is on League Island, which comprises approximately 1000 acres, of which over 41 acres are covered by the enlarged plant. A considerable increase in paving, railroad tracks, roadways, etc., was required and was provided for in the allotment, which, including the hangar, amounted to $3,678,000, which was approved for the project by the Secretary of the Navy Jan. 27, 1918.

In the design of the buildings provision was made for sprinklers and the buildings were also supplied liberally with fire boxes, sand boxes, and fire extinguishers.

Responsibility for the securing, development and retention of a satisfactory personnel, outside of the executive staff, was placed in an employment department, under the direction of an employment superintendent. The employment superintendent is one of the five main department heads reporting to the manager. The specific functions assigned to the employment department originally included employment and training. Later, as the work developed, responsibility for a certain amount of factory follow-up and for all service work of the factory was added. * * * *

The Engineering Department

In getting the factory into production, this service of the engineering department was of inestimable value, also in the investigations of spiral grain and the use of laminated members for struts and wing beams. Early practice dictated that struts and wing beams should be made in two pieces and lightened. The difficulties in the way of getting materials of the proper quality in the necessary large sizes finally brought about the adoption of laminated pieces. Struts, for instance, were made with three laminations, and each lamination might be in two pieces, making six-piece struts. Wing beams were at first spliced, then laminated, and then the laminations were spliced, and finally instead of two laminations three were used. Examples of each are shown in Figs. 12 and 13.

In working out this practice it was found that apparently good struts would warp or in testing would fail under small loads. Investigation disclosed the fact that the laminations must be of equal density to avoid these faults. For instance, in the two-piece strut if one lamination is of greater density than the other, the lamination of light density would yield under load more readily than the heavy lamination, thus throwing all the load on the heavy one and bringing about early failure. Further study made it necessary to match not only in density but in grain, as is illustrated in Fig. 14.

The Wood Technology Section was faced with the problem of discovering why during the winter from 9 to 10 o'clock every morning the steam-bent spruce and ash stringers would start breaking; one morning five bent members broke within half an hour. Investigation developed the reasons. It had been customary to allow the temperature in the plant to drop during the night to 50 deg. Fahr. and starting at 7 o'clock in the morning the temperature was brought up and by 9 o'clock would be normal (65 deg. Fahr.). The wood could not conform so rapidly to the changing atmospheric conditions, and the attempt to conform introduced internal stresses which broke the pieces. Thereafter the night temperature was held at the level of the day temperature and the trouble disappeared.

Considerable difficulty was experienced in getting satisfactory wood inspectors, due to the refined requirements. Defects that were not important to the commercial inspector of lumber or inspector of wood parts were found to be of prime importance in the aircraft factory. The question of strength was, of course, paramount, and thus it was necessary to discover hidden defects, and hidden defects are quite common in spruce.

Wood Defects a Problem

Three of these defects difficult to observe are pitch pockets, spiral grain, and compression failure, none of which was very clearly recognized before the war. A typical example of spiral grain is shown in Fig. 15. Spiral grain is exceedingly difficult to detect, particularly in fresh cut material and is exceedingly treacherous, especially under shock or impact. This defect was given magnified importance at one time, but even after the excitement had subsided its danger was appreciated and has been minimized largely by the practice of laminating. A piece containing spiral grain will split straight along the growth grain, but will cleave at a distinct angle across the growth grain. It is discovered by looking for indistinct and sometimes nearly invisible veins of sap. The engineering department made a long series of tests in the study of spiral grain and with the strength data obtained and after a study of the stress diagram, spiral grain tolerances were modified and reduced, which greatly facilitated the production program.

Bolt Practice

In the design originally put into production in this factory, the variation in diameter of bolt was by 1/32 in. and in length of bolt by 1/16 in. As these bolts were all of special dimensions and of special stock, heat treated and electroplated for protection again corrosion, and as the number of sizes was great, production difficulties and complications arose due to long part lists, numbers of drawings, specifications, contracts, stockbins, stockcards, etc. Therefore, five diameters were adopted as standards by the Department, namely, 3/16, ¼, 5/16, ⅜ and ½ in., and the variation in length was made by ⅛ instead of 1/16 in. By this means the number of sizes was reduced enormously.

In the early practice castle nuts and cotter-pins were used on all bolts. These bolts were, of course, hardened by heat-treatment and it is exceedingly difficult to drill them on assembly, requiring much time, causing the breaking of many drills, and frequently on wing panels, resulting in damage to the fabric which required patching. This practice was immensely simplified by the use of washers under all nuts bearing on metal surfaces; and nuts bearing on wood surfaces were headed over unless it was necessary to have them readily removable. This reduced the assembling time of many assemblies and further simplifies the production problems.

How Material Was Obtained

At the time the factory was projected the markets had been pretty well cleared of available stocks and the operation of the priority system had not been satisfactorily worked out by the Government, so that the material problem was exceedingly difficult. The factory being a beginner had absolutely no stocks. It was necessary to buy all materials through the purchasing routine of the Navy Department, buying on specifications and only after the widest possible competition. Materials were just beginning to come in when the freeze-up and traffic paralysis occured, and much valuable time was lost.

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Major James A. Meissner, A. S., A.

Among the Air Service heroes who returned on the Adriatic was Major James A. Meissner, who accounted for eight German planes. He has been awarded the Croix de Guerre, the Distinguished Service Cross and has been cited in army orders. He was graduated from the Erasmus Hall High School in Brooklyn five years ago as a spindle shanked lad of 17, and returned February 3 to a reception given at the school, with honors enough almost to satisfy the several hundred boys and girls who crowded about the platform to greet him. His own classmates and many of those who have since been graduated from the school also rushed into the assembly room, and he shook hands with 3000 before leaving.

J. Herbert Low, the principal, made an address in which he told how proud Erasmus Hall was of Jimmy, and then handed him a document with seals and ribbons attached, which conferred the "freedom of the school" upon him. Mr. and Mrs. Carl A. Meissner, of 45 Lenox road, Brooklyn, the aviator's parents, sat on the platform and beamed their approval.

Major Meissner was a member of the class of 1917 at Cornell University.

Another problem faced the supply department, due to the policy that the naval aircraft factory should add to the aircraft industry. It followed that as the principal dealers in aircraft materials had all, or nearly all, of the work they could handle, it was necessary to develop new sources of supply. A force of traveling representatives was kept on the road to interest new plants, and to investigate bidders' capabilities to deliver goods; and they were later used to expedite production in these sources. Particular attention was paid to the task of teaching these vendors how to manufacture materials and parts to meet specifications and requirements of the aircraft industry.

This section was supplemented by a traffic and following-up section, which attended to the routing of traffic and following it on the road, and the factory, like all other aircraft factories, operated a "suit-case express" to meet its own urgent requirements and those of its subcontractors.

The naval aircraft factory is a larger institution than the entire navy yard was before the war. It used in manufacturing over three times the quantity of lumber that the League Island Navy Yard uses at the present time. It handled more shipments per day than even the New York Navy Yard before the war. Up to the signature of the armistice the lumber yard received 16,000,000 board ft. of lumber and stored it properly; 7,759,000 board ft. were used in manufacturing or shipped out to sub-contractors for the manufacture of hulls or parts; and there remained about 6,000,000 ft. in the yards at the cessation of hostilities.

A perplexing problem was the loading of completed flying boats. On account of the large dimensions of the hull case, rail shipment was undesirable. Boats shipped by other manufacturers in this way having been damaged, shipment by canal barge was developed and proved successful, except, of course, in case of those planes shipped abroad from the factory. Every plane loaded at this factory arrived at its destination without damage due to shifting of cargo or other incident attributable to the method of securing it.

Source of Spruce

The spruce supply problem was solved by the Navy Department in contracting for New England spruce. This comes in smaller sizes than the western spruce; but by laminating beams and struts, and by splicing beam laminations, purchase of army spruce at from $300 to $750 per thousand was discontinued and navy New England spruce was taken at from $100 to $125 per thousand; also 2,500,000 ft. shipped overseas for aviation purposes.

The variety of materials required was greater than would at first be supposed; many of which were, both in character and treatment, unfamiliar to the workmen, necessitating experiments, frequently resulting in ruining parts. All materials passed through rigid inspection, not only on receipt at the factory, but after each stage in manufacture.

Special Tools and Fixtures

Methods, tools and appliances were in many cases new or untried, or adaptations from other trades, as, for example, an emergency blanking die, good for from 100 to 500 pieces, which could be manufactured in our toolroom in from 12 to 24 hr. The die was mounted on a base and separated therefrom by spacing blocks somewhat thicker than the material to be punched. The punch was a loose piece of machine steel guided to the die by the guide block, held in position above the die. This device was used on ordinary stamping presses for material to and including ⅛ in. thick.

Jigs and fixtures for bending, welding, cutting, drilling and testing, frames for setting up an assembly, were developed and built up by crews in each shop designated for the purpose.

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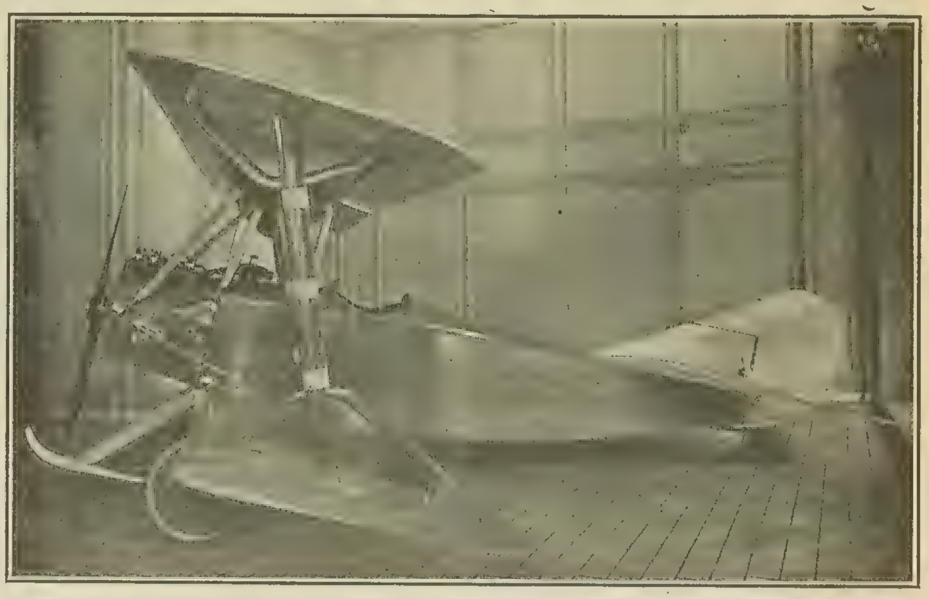

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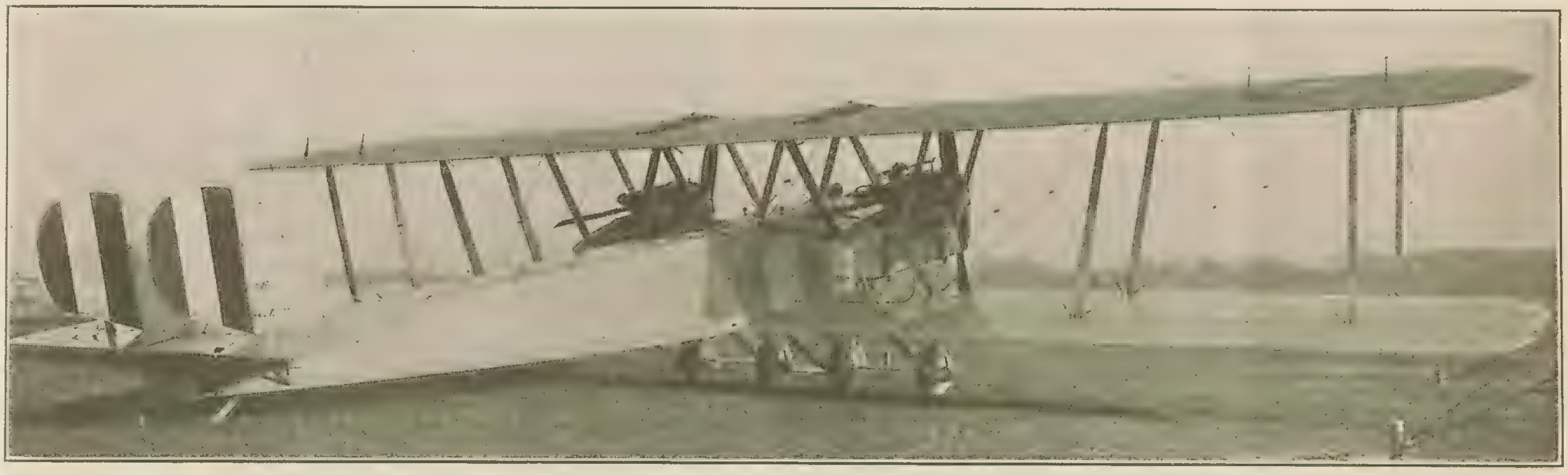

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The ACE Biplane Lands in Fifty Feet

The ACE biplane manufactured by the Aircraft Engineering Corporation has been creating much favorable comment at the Central Park Airdome by its performances in speed, climb, and maneuverability. The first after-the-war model designed strictly for civilian use has shown the possibilities of commercial craft when designed for the use to which they are put.

One of the most interesting tests conducted was that to determine its landing speed, and in this it was shown that the length of forward travel after the wheels touched the ground was less than fifty feet.

A feature new to most of our workmen was the small tolerance permitted in wood, as well as in metal, to secure minimum weight and avoid hand-work in assembly.

The floor space allotted to the various shops was based on the speed requirements indicated by the program chart, and so arranged that the flow of material was as much as possible in a forward direction, with a minimum of back-tracking, and sub-assembly storerooms were located at convenient points in the line of flow of material, between the shop where the part was manufactured and the shop where it was used. In this manner large storage areas were avoided and the sub-assembly storerooms were continually under the eye of the shop foreman, while records of their contents could be reported daily to the manufacturing office, where the records were kept and orders so issued so as to keep the various crews busy, to avoid accumulation of parts, thus saving floor space and delivering finished parts and sub and major assemblies when, where and as required.

How Production Was Maintained

The first order was for fifty seaplanes to be delivered by July 1, 1918. Early in March a program was mapped out after consultation with the foremen of the shops, showing when we could reasonably expect to complete the first plane, then in process of construction. With that as a beginning date, a curve was drawn to July 1, the date of completion, showing the number of planes to be completed week by week, increasing as the men became expert in their work, more men could be secured and trained more rapid and uniform supply of parts secured, and the organization improved. From this program for finished planes there was prepared a schedule showing dates on which the necessary number of metal, wood and other parts would be required, then the dates on which materials for such parts should be delivered and tools for their manufacture secured. These fundamental schedules were placed in the hands of the supply department, employment department and foremen, and systematically followed up, the progress made in securing men and materials being followed by progress curves, which were compared daily with the schedules showing like requirements. This method not only gave warning ahead of time of what would be required by each foreman for the accomplishment of his program, but also told him what would be required from his shop on any given date.

Drawings and instructions were scheduled in the same maner, which made it possible to concentrate first on drawings for parts which required longest to manufacture or which were needed earliest in the construction of the plane.

In the usual maner the manufacture of wood and metal parts, assembling of panels and hulls, painting and final assembling were assigned to separate shops; the work of each separate shop being further subdivided by crews doing similar work, every effort being made to select for these crews men or women who were, by previous experience or shop training, familiar with the particular type of work.

As an illustration of the advantage of subdividing the work so that each man was given a job which he could repeat day in and day out, there is cited the method of building hulls. The earlier hulls were each built by separate crews, each building a hull in its entirety, and as a natural result each man in the crew performed such a variety of work that no one did enough of any one thing to learn how to do it well and rapidly. The shop was full of hulls in various stages of completion, it was with great difficulty that the materials required by each crew were kept on hand, and more or less confusion was the result. There were nine of these crews, varying in size from 15 to 25 men, and the first step in separating the job into its component parts was to select the operation requiring the greatest number of man-hours. This was found to be the planking of the bottom of the hull. At first this operation required a crew of 20 men, working 4½ days, or 900 man-hr. By increasing this crew to 40 men, the time was reduced to one day or 400 man-hr., the men working without interfering with each other or any other crew, as the hull was theirs for that day.

How Time Was Saved

The construction of the hull was divided into such operations as framing, brace wiring, planking, etc., each of which covered a similar kind of work. These operations were then grouped so that as many crews as possible could work on the hulls at the same time without interfering with each other, after which the various crews were built up so that each group of operations was completed in one day. By this method the time required to complete a hull was reduced from 41 to 16 days, which not only saved time and men, but floor space as, by providing sixteen berths, we secured a delivery of one hull per day; by apportioning the construction of the hull to 16 crews, each doing a day's work on each hull, it was practicable, by having 16 planes under construction, to have all planes simultaneously undergoing separate operations, and have each crew move from one plane to the next at the end of each day, thereby giving place to the crew performing the next operations. The speed of delivery was later raised to more than one plane a day by increasing the number under construction at one time.

The same method was followed out in the final assembly of planes. Whereas the first plane required for its final assembly 50 days, with a crew of 35 men, the second 27 days, the third 17 days, this time was finally reduced to 7 days. In the subdivision of work in final assembly, every effort was made to remove from the plane such work as could be done elsewhere; as, for example, the wiring of the hull for heat, light and ignition. At first this required 114 man-hr. per plane. By assembling parts on benches, this was reduced to 72 man-hr. per plane. The time on the plane itself was at first 30 hr. and was later, by the use of jigs, reduced to 10 hr. The advantage was not only in the reduction of labor cost, but also in the completion of the work in a short time. The hull is delivered to the final assembly floor with the wiring-board in place. This board is removed, placed on a jig, and in 1½ hr. is ready to replace on the plane. In 30 min. after the wiring-board is completed on the jig, it is replaced in the plane and all dependent operations may proceed; the wires having been previously cut to guage, terminals fitted and soldered, wires assembled by charts, and errors practically eliminated. It may be mentioned that the work on this jig covered three systems of wiring, namely, heat, light and ignition; and that women learn to do this portion of the work in a day.

Another example of the subdivision of labor is in the construction of pontoons, which, under the first method of having one crew build the pontoons complete, required 279 hr. per pontoon. By dividing the construction into various operations, each performed by a separate crew, the time was finally reduced to 40 hr. per pontoon.

As to progress in cost reduction, it may be stated that the factory cost, including overhead, of the last twenty boats, out of the first order for 50, was less than half that of the first ten, and was considerably less than the price at which the navy was buying these boats from other plane factories.

Cost Records as Essential as Planes

One of the chief reasons for the establishment of the naval aircraft factory was to obtain data on the cost of aircraft and aircraft parts for the information and guidance of the Navy Department and its bureaus in dealing with private manufacturers. It was obviously necessary, therefore, that all those elements of cost with which the private manufacturer is burdened should appear in the course of the output of the naval aircraft factory. In other Government-owned establishments a great share of the burden is charged direct to operating appropriations, under the Navy Department, and does not apear in the cost of output. The naval aircraft factory being a new institution, it was arranged to introduce a system of accounts and of procedure which would permit the inclusion of all overhead, and the scheme was successful. The overhead contains interest on plant, depreciation (after the first year) and allowances for all the other standard items except profit and taxation. Even the salaries of naval officers are included in the costs.

In this department, as in the supply department, it was necessary to conform to statute, navy regulations and the requirements of the Treasury Department, and of course in such a way as not to interfere with the establishment of a thoroughly practical commercial cost-keeping system. It will readily be seen that its immediate and difficult problem was to observe these multitudinous requirements with a perfectly green crew. Timekeepers, for instance, were recruited from the industrial force of milk wagon drivers, trolley car conductors, etc., and the word chaotic is the only one to use in describing the early condition which, however, due to the energetic and clear-headed work of the accounting officer, was soon put on an orderly basis, with the result that the naval aircraft factory payrolls and other financial returns were made promptly and accurately and in conformity with the regulations.

Expense was distributed to the different departments, acording to its nature; that is to say, building charges on the basis of space; machinery and equipment charged on the basis of equipment supplied; supervision and similar charges on the basis of services rendered. It was and is the intention eventually to apply expense by a machine rate method, but it being necessary to get started quickly, a man-hour basis of distribution was adopted to begin with and is still in use.

Every worker has a time-card for every day and every item issued from stores is covered by its own separate stores requisition. Costs are kept by production order and are separated out and reported by appropriations and according to all the detailed requirements referred to in gneral above.

Space forbids discussion of the problems involved by the exclusive cognizance of the bureaus of the Navy Department over its own appropriations. If space allowed, a statement of the various restrictions would be as interesting as their application was difficult.

Outside Contracts Handled Separately

The term contract manufacturing is intended to cover the production of hulls, assemblies and parts by private manufacturers for assembling at the naval aircraft factory, as called for by the enlarged program referred to above. This required a separate department. It will probably be agreed that it is much more difficult to hire other plants to do one's work than to do all the work oneself, because of the difficulties in placing orders, contractual relations, getting the contractor to manufacture the goods as wanted and deliver them when wanted, the difficulties introduced by transportation, to say nothing of the difficulty of maintaining quality and holding down prices.

In this particular case the problem was much more difficult because none of the contractors understood the work and they and their workers had to be taught. Although every effort was made to choose sources already completely equipped, this was not practicable, and it was necessary to add to contractors' equipment in many cases and to a considerable extent. The war conditions made it hard for private manufacturers to get material and labor and to hold their labor. Transportation problems were difficult beyond all expectation and altogether the manufacture of parts in subcontractors' plants is an undesirable policy. In defense of it, there can be said this, that the Naval Aircraft Factory got its parts almost as fast as they were wanted and that by dint of exceedingly careful and thorough instruction, the required standard of quality was maintained. Also the Navy finds itself, now that the war is over, with a much smaller plant expenditure on its books than it would otherwise have had.

The policy in placing contracts was to select plants as nearly as possible properly equipped and of manufacturing experience which made their organization and personnel readily adaptable to the production of aircraft; also to establish for each part or assembly two or more sources in different localities, so as to protect the manufacturing program against interruption in supply, due to fire, labor, transportation or other difficulties.

In each plant was established a branch office of the Naval Aircraft Factory in charge of a branch manager, with production, inspecting and teaching assistants. Service was extended to the subcontractors in getting material and labor, because the Naval Aircraft Factory organization knew better how to deal with the bureaus of the Navy Department and with the other departments, commissions and boards of the Government.

GREAT TYPES OF AIRCRAFT FOR THE SHOW

From the NC-1 to the Original Wright and a Langley Copy

EXHIBIT OF ACCESSORIES

Official Government Displays in Preparation for the Exposition at Madison Square Garden, March 1-15

Official government exhibits for the annual aeronautical exposition of the Manufacturers Aircraft Association are being shipped to naval depots and army flying fields near New York City. At these places the planes and motors will be prepared for truck transportation to Madison Square Garden and the Sixty-Ninth Regiment Armory, where March 1 to 15, the exposition will be held.

It is now definitely known that the greatest types of aircraft from the United States, Great Britain and Italy will be on display, the Navy N C-1 and an all-American bomber being placed in the Garden and a Handley-Page and an Italian government Caproni in the Sixty-Ninth Regiment Armory.

In the Garden, in such proximity to the great American machines that the contrast will be striking, will be the original machine in which Wilbur and Orville Wright made the first flight in the world's history in a heavier-than-air machine. Near this old Wright plane will be a copy of the original Langley plane, which, although built before the Wrights made their flight, was not flown until afterward and after Prof. Langley's death.

A remarkable feature of the exposition will be the accessories exhibit. Although the aircraft industry is very young it has already called into being a vast system of subsidiary manufactories. There are some 35,000 parts in a De Haviland airplane and many of these parts come to the airplane plants complete and ready for installation. Just as the accessory and parts people form an essential part of the automobile business, so they are entering into the production of airplanes and lighter-than-air craft. Bearings, veneer, glue, fabrics, castings, instruments, wire, leather and rubber form the elements of the airplane and their importance will increase as the plane is devoted more generally to commercial purposes. The accessory exhibits will occupy extensive space on the elevated platform of the Garden, in the exhibition hall and in the armory.

Many of the planes proposed by the navy will be exhibited by the various people who produced them, so that the naval flying section of the exhibit will include mainly the N C-1, the fifty passenger flying boat; the Loening Kitten and a model of a rigid dirigible. There will also be a display from the Naval Aircraft Factory at League Island, showing an F 5 boat hull, with wing and tail sections.

The naval instrument section will include an accelerometer, air speed meters, balloonet gauge, bilge pumps, communication helmets, fire extinguishers, hydrogen leak detectors, incidence indicators, inclinometers, instrument board, K. B. board box, manometers, oxygen respirators and breathers, pigeon carrier, safety belts, tension meter, turn indicator, etc.

Only the navy type of rotary motor will be shown in the motor section of the Bureau of Steam Engineering Exhibit, but unique and foreign types of radiators will be included, as well as radiator shutters, oil and water heaters for use in cold water, self-starter for Liberty engines, combination electric and hand starter for Liberty engines, radio equipment, electric equipment, lamps, intercommunicating sets, airship type of running lights, electric heated clothing, recognition lights and compass receiver.

The Bureau of Ordnance will show aerial bombs of various types, wind vane and ring sights, pistols and ammunition, the full ordnance of guns and equipment to be carried on the N C-1.

The Bureau of Navigation has available for shipment to New York an interesting collection of instruments including the following: Taylor altimeter, 20,000 feet; Tagliabue altimeter, 25,000 feet; keyless clock, Waltham clock, electric clock, various types of compasses, barograph, pocket aneroid, atlas chart board, course and distance finder, bearing plate, navigation note book, deviation cards, statoscope, goggles and life jackets.

The navy has just received from abroad a consignment of carrier pigeons with remarkable war records. These pigeons will form another part of the exhibit.

As a distinct feature, the navy also plans a motion picture exhibition, having just completed reels showing flights over Washington and along the Atlantic coast.

General Mitchell Decorated

Brig.-Gen. William Mitchell, chief of Air Service, 3d Army of Occupation, A. E. F., was named a Commander in the French Legion of Honor on Jan. 14, with nine other American general officers.

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Aeronautical Engineering and Airplane Design

By

LIEUTENANT ALEXANDER KLEMIN

Air Service, Aircraft Production, U. S. A., in Charge Aeronautical Research Department, Airplane Engineering Department. Until entering military service in the Department of Aeronautics, Massachusetts Institute of Technology, and Technical Editor of *Aviation and Aeronautical Engineering*. In two parts.

Part 1. Aerodynamical Theory and Data

Modern Aerodynamical Laboratories
Elements of Aerodynamical Theory
Sustention and Resistance of Wing Surfaces
Comparison of Standard Wing Sections
Variations in Profile and Plan Form of Wing Sections
Study of Pressure Distribution
Biplane Combinations
Triplane Combinations—Uses of Negative Tail Surfaces
Resistance of Various Airplane Parts
Resistance and Comparative Merits of Airplane Struts
Resistance and Performance
Resistance Computations—Preliminary Wing Selections

Part 2. Airplane Design

Classification of Main Data for Modern Airplanes; Unarmed Land Reconnaissance Machines; Land Training Machines
Land Pursuit Machine; Land Gun-Carrying Machine; Twin-Engined All-round Machine
Estimate of Weight Distribution
Engine and Radiator Data
Materials in Airplane Construction
Worst Dynamic Loads; Factors of Safety
Preliminary Design of Secondary Training Machine
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Personals

Effective on the discharge from military service of Col. Arthur Woods, A. S., A., Col. Archie Miller, A. S., A., in addition to his other duties, has been announced as Acting Assistant Director of Military Aeronautics.

Lt.-Col. William Thaw and Major Charles J. Biddle, A. S., A., were announced as members of the board to assist and co-operate with the Secretary of the Interior and Mr. George B. Dorr in the matter of the erection of a monument in the Sieur de Monts National Park to the aviators who have died during the war.

Col. Walter G. Kilner, A. S., A., having reported to the Director of Military Aeronautics, from American Expeditionary Forces, Headquarters Services of Supply, France, has been assigned to duty with the Training Section. He left Washington recently for an extensive trip, terminating in California.

Major Harrison H. C. Richards, J. M. A., who reported at the D. M. A. on Jan. 21, has been assigned to the Supply Section.

Lieut.-Cols. Daniel M. Cheston, Jr., and Augustine W. Robins, J. M. A., have reported to the D. M. A. and been assigned to the Supply Section.

Lt.-Col. B. K. Yount, A. S., A., left Washington, Feb. 8, for San Diego, Cal.

Capt. Reed C. Landis, A. S., A., America's second living "Ace," has been assigned to the Executive Section and has left for Chicago for duty.

Col. Edward A. Deeds, A. S., A., is announced as on duty in the Supply Section, Office of the Director of Military Aeronautics.

Col. M. F. Davis, A. S., A., is relieved from duty as Chief of Training Section, and will report to the Director of Air Service for Assignment to duty.

Col. Joseph C. Morrow, A. S., A., having reported on Jan. 22, 1919, No. 11, American Expeditionary Forces, Headquarters Services of Supply, has been assigned to duty in the Training Section.

Col. W. E. Gillmore, A. S., A., has been announced as Chief of Supply Section, vice Col. C. G. Edgar, A. S., A., relieved therefrom and transferred to the Executive Section.

Capt. W. F. Volandt, A. S., A., has been appointed Contracting Officer for the Division of Military Aeronautics to execute on behalf of the United States all contracts for the Division of Military Aeronautics, except contracts with Schools, Colleges and Universities, vice Capt. Clinton G. Brown, A. S., A., relieved.

Lieut.-Col. Bert M. Atkinson, A. S. A., has been ordered from Washington, D. C., to command the First Reserve Wing, Hazelhurst Field, Mineola, L. I.

Sec. Lieut. Charles T. Peed, A. S., P., has been ordered from Washington, D. C., to Detroit, Mich., to report in person to the district manager, Aircraft Finance, 1550 Woodward avenue.

Sec. Lieuts. Glenn E. Messer and Wm. M. Toomer, A. S., A., have been ordered to Kelly Field, San Antonio, Tex.

First Lieut. Daniel W. Hogan, A. S., P., has been ordered to New York city, to report in person to the district manager, Aircraft Finance, 360 Madison avenue.

Capt. Brady W. Warner, A. S., A., has been ordered to Arcadia, Fla.; Capt. Shirus, A. Blair, A. S., A., to Eberts Field, Lonoke, Ark.; Capt. Henry E. Reece, A. S., A., from St. Paul to Washington, D. C.; Capt. Harry J. Vogel, A. S., A., from Princeton to Washington, D. C.; Capt. Edward J. Ralph, A. S., A., from Kelly Field to Washington, D. C.; Capt. Charles A. Reid, A. S., A., from Washington to Chicago; Capt. Horace Green, A. S., A., from Washington to Marsh Field, Riverside, Cal.; Capt. George W. Price, A. S., A., from the Army Balloon School at Lee Hall, Va., to Washington; Capt. James E. Dunlap, from Taylor Field to Park Field, Millington, Tenn.; Capt. John Howry, A. S., A., from Emerson Field to Camp McClellan, Anniston, Ala.

Capt. Harold D. Hynds, A. S., A., from duty with the U. S. Shipping Board, San Francisco, to Washington, for discharge, and Capt. John D. Morey, A. S., A., from Taliaferro Field to Barron Field, Everman, Tex.

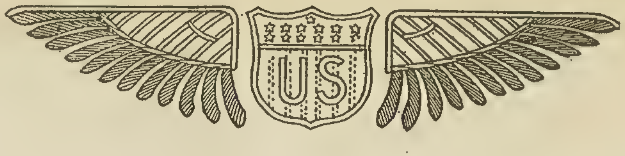
Lieut.-Col. George W. DeArmand, A. S., A., has been ordered to Little Rock, Ark., to take command of the aviation general supply depot at that place.

Major John J. O'Connell, A. S. A., is ordered from the First Reserve Wing to Love Field, for duty.

Lieut. Arthur T. Clark, son of Mr. and Mrs. John H. Clark of 231 Sanford Avenue, Flushing, who recently received an honorable discharge from the service, has entered the Auburn Theological Seminary at Auburn, N. Y., where he will study for the ministry.

Capt. Wilbur F. Wright is ordered from Fort Sam Houston to duty at the United States School of Military Aeronautics, University of Texas, Austin.

Major Frank D. Lackland, S. C., is relieved as commanding officer of Selfridge Field, and appointed commanding officer of Langley Field.



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As only a very limited number of copies of the original report were printed and no more can be obtained in this country, the Manufacturers Aircraft Association, Inc., has reprinted the complete report (83 pages of text) in attractive pamphlet form, size 13 x 8⅜.

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AIR SERVICE JOURNAL

The National Aeronautic Newspaper

VOL. IV. No. 8 NEW YORK, FEBRUARY 22, 1919 PRICE 10 CENTS

Smithsonian Institution
FEB 4 1919

GOVERNMENT EXHIBITS AT THE BIG SHOW

First Opportunity to See Our War Aviation Attainments

HOW PILOTS ARE TRAINED

Names of Some of the Exhibitors at the Aeronautical Exposition to Be Held March 1-15

In addition to showing the accomplishments of aeronautical and automotive engineers during the last two years, the War Department's exhibit at the annual aeronautical exposition of the Manufacturers' Aircraft Association will show how the Air Service trained its aviators for foreign service. From March 1 to March 15—the period of the exposition—principles of training, equipment and instruments used, motion pictures of actual work, and the various machines which figured in the educational course of the pilot will be demonstrated at Madison Square Garden and the 69th Regiment Armory in New York City.

The co-operation of the War Department with the Manufacturers' Aircraft Association has been so complete that much of the space in the two exposition buildings has been taken over by the military branch for official exhibits and demonstrations.

How Aviators Are Trained

Beginning with the medical tests and ending with the combat planes used on the other side, the exhibits will cover almost every phase of the pilot's instruction and work. Models of the war zone used in elementary ground schools will be operated by officers of the Army to demonstrate to visitors just how these devices entered into the necessary curriculum; the whirling chair will be installed by the medical branch of the air service and flight surgeons will be on hand to test any one's fitness for aerial work; clothing and instruments used by aviators after they began actual flying will be shown, and then the ordnance—machine guns and bombs—will be demonstrated on the ships which have carried them in the war game.

Training ships, pursuit planes, reconnoissance machine and the big bombers will be included in the Government's exhibits, and there will be types of English, French, Italian and German planes to compare with the American-made products.

Machines and Trophies

The Handley Page bomber, the Spad and the S. E. 5 will be the English models shown; France will be represented by a Nieuport and Breguet; the Italian Caproni and S. V. A. will be installed in the halls, and a German Fokker and Rumpler will be the trophies on display.

The War Department's mechanical display will include all motors used in training and combat work, motor parts and cross sections of parts to show their detailed construction.

The balloon section of the Army will include a Caquet, a French Barage, a spherical balloon, a propaganda outfit which will distribute literature during the exposition, smaller kite balloons and a winch and parachutes. Men from the balloon section of the Air Service will

(*Continued on page 12*)

Gen. Kenly Commends Officers and Men

WAR DEPARTMENT
Air Service
Division of Military Aeronautics
Washington, D. C.
February 13, 1919.

GENERAL ORDERS
NO. 12

To the Officers and Enlisted Men of the Air Service:

1. It seems fitting at this time to express my appreciation of the splendid work performed for the past year or more of war activities, by the officers and enlisted men of the Division of Military Aeronautics. Many of you are now returning to civil pursuits with the regret that you were not among the more fortunate ones who experienced actual service overseas. To you who have labored night and day, undertaking hazardous duties in all weather, that the training of our fighting air men might continue without interruption, I express my sincere thanks for your steadfast devotion to a duty which so suddenly became apparent would involve little hope of commensurate reward. The interminable grind of performing the same hazardous duties over and over again in order that others less experienced might be fitted for the work in hand, and then to have your former students sent to the Front while you "carry on," requires a quality of pluck and steadfast determination which the fortunate few who have never experienced such heart-rending disappointment can never understand.

2. To those who served overseas and return to this country with the satisfactory feeling of difficult duty well done, I offer my sincere congratulations for your worthy accomplishments.

3. For those who met an untimely end in our service, I am sure we all hope that they may receive the reward they so justly merit for the extreme sacrifice.

W. L. KENLY,
Major General, U. S. A.,
Director of Military Aeronautics.

All the Balloon Passengers Safe

All the passengers in the free balloon reported burned near Salisbury, Md., Feb. 5, are safe according to telegraphic advice received from Captain L. B. Montfort by the Chief of the Balloon and Airship Branch of the Army Air Service. The balloon left Potomac Park, Washington, D. C., piloted by A. Leo Stevens, Aeronaut, with Lieut.-Cols Dargue and Hunter, and Captains Phillips and Montfort as passengers. The details of the accident are not known to the Division of Military Aeronautics Colonel Dargue telegraphed that the entire party escaped injury.

MAJOR SMITH RETURNS TO SAN DIEGO

First Man to Cross the Continent and Return in an Airplane

TIME LESS THAN 40 HOURS

Interesting Career of the Intrepid Flier from Rockwell Field; Built a Plane for Himself

High winds and soft landings, which have disabled three of the four army airplanes that left Washington for the Pacific coast, have not deterred Major Albert D. Smith, in charge of the squadron, from completing the trip, and he made the last leg of the flight to San Diego alone, the War Department has announced.

The four airplanes left Washington on February 4. They arrived at Columbia, S. C., in six hours and forty-five minutes. Thence they went to Emerson Field, Ala. At Vernon, Ala., one airplane struck a tree while taking off in the mud. The three others left Payne Field, Miss., on February 10, for Dallas, Texas, making the 450 miles in seven hours and thirty minutes. From Dallas the squadron flew to El Paso, a distance of 570 miles, in nine hours and forty-five minutes against a strong head wind, stopping for gas at Big Springs.

At El Paso a high wind struck the city early in the morning of February 12, and two of the remaining airplanes were badly damaged.

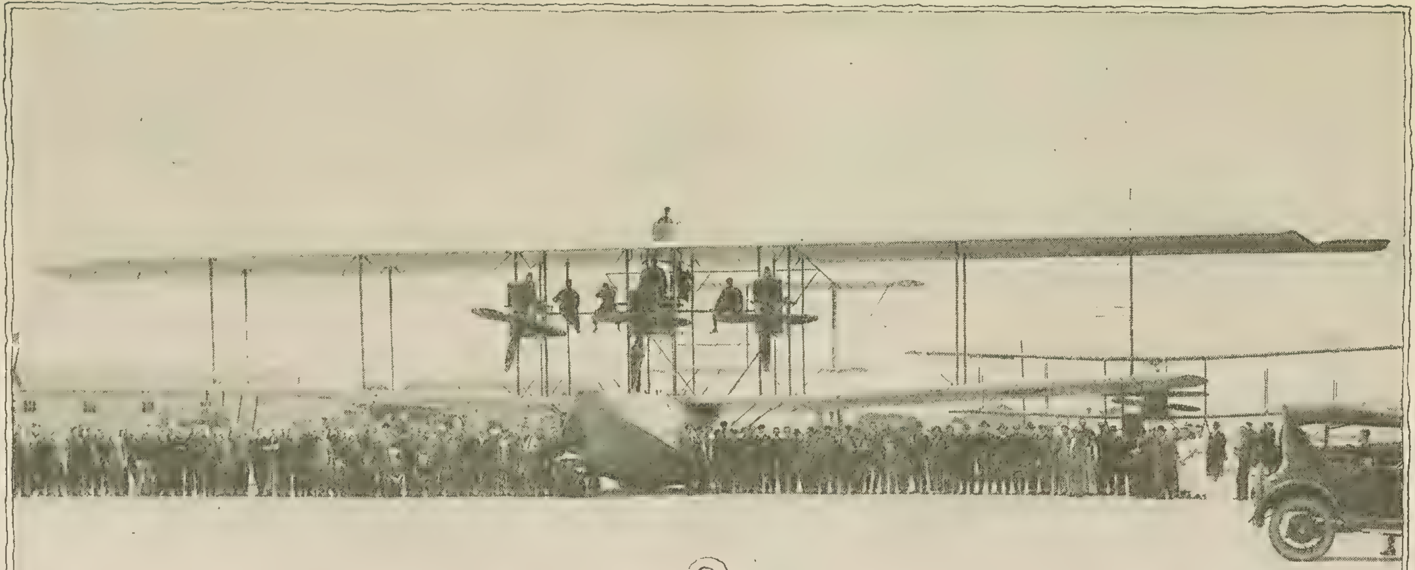
Major Smith reached San Diego in the evening, Feb. 15. The trip was made in between thirty-five and forty hours, or from fifteen to twenty hours under the flying time on the trip from San Diego to New York. The official flying time from San Diego to New York was fifty-five hours, but the return time has not been compiled, though Major Smith said it probably would be between thirty-five and forty hours.

Major Albert D. Smith, who commanded the army fliers on the first transcontinental air trip, was in the army aeronautics service before our declaration of war. He has the unique record of teaching himself to fly in a machine built entirely by himself. He first flew eight years ago, at Spokane, Wash. He had studied the available literature on aeronautics, and had read of Glenn Curtiss' planes. He constructed his plane on the same model.

"I learned more in the first thirty seconds in the air that time," says the major, "than I have ever learned since. Luckily I didn't get killed that time, and was so fascinated with the flying game that I have stuck to it ever since."

After perfecting himself as a pilot, Smith gave a series of exhibition flights in varions parts of the country. He received an offer from the Japanese government to go to Tokio and take charge of the development of aeronautics for the Japanese army. While waiting at San Francisco for a steamer, he visited the United States army flying field at San Diego. Officers there persuaded him to give up the Japanese appointment and enter the United States service. He is regarded as one of the most efficient pilots in the army. In 1914 he led the aerial search into Mexico for the two lost pilots, Lieut. Robertson and Major

(*Continued on page 9*)



A Great Naval Achievement

The remarkable flying boat shown in the photograph above is one of the epoch making achievements of naval aviation. It is the largest flying boat in the world—a craft capable of flying with eleven (11) tons. This same naval plane recently flew with fifty Navy men and pilot aboard.

Developed and built at The Curtiss Engineering Corporation, Garden City, by Naval Constructors working in collaboration with Glenn H. Curtiss and his engineers, it stands today as a proved product of unquestioned superiority, entirely American in its conception, evolution, manufacture and performance.

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Vol. IV February 22, 1919 No. 8

Criticism of the Air Service, A. E. F.

The criticism of the Air Service, A. E. F., by returning officers will have to be met sooner or later and the whole matter frankly discussed. Whether another investigation is warranted by the generalities given out can only be determined when the specific facts are available.

The comment may be roughly grouped in three parts. First, that the Air Service did not receive proper recognition by General Pershing and that promotions for efficient work were not made. Second, that the discipline of Air Service Officers was maintained at an unduly severe standard by officers of other branches of the service under whom they served. Third, that the American planes and engines were not satisfactory to the pilots and that they were regarded as inferior to foreign planes and engines.

So far as the promotion criticism is concerned, it applies as forcibly to the Air Service in this country. Many of the most worthy officers were not advanced in rank owing to the confused condition of the policy adopted. Up to a few months before the armistice, promotions were made by merit, but latterly they were made up to the grade of Major by seniority. Both plans had their disadvantage and the result has been criticism of a justifiable kind.

The treatment of Air Service officers by other branches of the service should be investigated. The jealousy of the Air Service has always been due to the advanced rank and increased pay received by regular officers on flying duty. This is one of the problems of the Air Service that will be solved by the new bills before Congress.

The character of the American planes and engines will always be an open field for discussion. From the point of view of the Production Bureau, they were following the best advice obtainable. Whether production methods gave the A. E. F. satisfactory machines will be one of the subjects that the future will have to settle.

Air Service Field Newspapers

With their backs to the wall, still fighting valiantly, are the young men who are engaged in editing and publishing the few remaining aviation training field and camp newspapers.

The attention of Air Service Journal is called by editor James E. Sinnot to the fact that about the only one left in the northern tier of fields is the Scott Field *Aerofoil.*

In sustaining camp morale few influences have better served their purpose than these publications gotten out exclusively by men in the Air Service. All of them have been interestingly, many of them brilliantly edited.

Reflecting the sorrows as well as the joys of the cadets, gathering here and there the wit and anecdote of the personnel the Air Service field newspapers performed successfully the functions they were intended to fill, and in no small measure contributed to the excellence and efficiency which marked the training of the United States Air Services.

Victory Creed

Major General George O. Squier has expressed what he calls a victory creed in such a forceful style that it should serve as a guide for all who have the best interests of the Air Service at heart. He says:

By a wise policy of readjustment, utilizing immediately our machines and our surplus aviators for the rapid expansion of the aerial mail and special passenger services, it will be possible to salvage for the nation a greater percentage of the money and energy invested for strictly war purposes than from any other feature of our war activities.

As a steward of the people, and in all humility therefore, I must not shrink from answering, as best I may, your request for a message which applies equally to peace and war.

The general principles which governed in the making of this enterprise in all of its ramifications of material and personnel, and to which the success attained must be attributed, may perhaps be formulated as follows:

> *To foster individual talent, imagination and initiative, to couple with this a high degree of cooperation, and to subject these to a not too minute direction; the whole vitalized by a supreme purpose which serves as the magic key to unlock the upper strata of the energies of men.*

The Greatest Race in History

With confidence now the country can look for the first real attempt at an oversea flight as the principal sporting event of early 1919 summer. Commander Towers, U. S. N., has been " ordered " to take charge of plans and assemble material and personnel for such an undertaking, and an order to a United States naval officer, as history so far has been written, has never been ignored.

The navy, it appears, has something in its locker in the way of a seaplane which navy experts are confident can make the flight. It is intimated that this hurry up order has been issued because of the navy's eagerness to make the flight before the hustling British navy has snatched the honor.

American bettors are too sensible to bet on sympathy, yet our guess is that the odds will be on the Yankees. *New York Sun.*

Making Certain Our Air Superiority

The exploits of American aviators with our own armies, and with the French, British and Italian forces, were so brilliant, there is not the slightest doubt that in the future we can have, if we will, a supremacy in the air such as our forefathers in the early nineteenth century had upon the sea. To make certain our aerial superiority, as a part of the national defense, it will be necessary for the aviation service to discard whatever may have been proved imperfect during this war, however cherished it may be in a sentimental way.

If the Liberty motor, into whose basket we put all our eggs, has not measured up to the advance notices, the time to discover that fact is now. The hundreds of millions that have been invested in it are of slight consequence in comparison with the millions that we must invest in aviation in the future. *The Washington Post.*

Big Navy—Big Air Fleet

As Captain Rickenbacker says, " developments of air fighting have made the control of the air dominate both the army and navy surface forces. Without the command of the air, no surface force of today can operate effectively."

In placing the country's air force at 10,000 skilled aviators, with five first-class planes available for each flier, Captain Rickenbacker does not place the figure at anything unattainable. His position is wholly sound *Buffalo Courier.*

RECOGNIZING THE MERITS OF OUR PILOTS

Board to Pass Upon Qualifications of Flying Officers

NAMED BY GENERAL KENLY

List of Those Who Have Been Recommended for Preferment by the Newly Appointed Body

A board of officers to pass upon the qualifications and merits of flying officers who have distinguished themselves in action has been appointed by Major General William L. Kenly, Director of Military Aeronautics. It is composed of the following officers: Col. Townsend F. Dodd, A. S. A.; Lt. Col. Benjamin F. Castle, A. S. A.; Major Horace M. Hickam, A. S. A., and First Lieut. Sidney T. Thomas, A. S. A., recorder.

The board will eventually review the records of all flying officers who were in action, with a view to awarding them such ratings as their achievements and abilities may warrant. These ratings will carry an increase in flying pay.

To date, only the pursuit or fighting pilots have received any recognition; this being in the form of a list of 63 fliers who have been credited with shooting down five or more enemy aircraft each, a list which is not complete. The new board will not only consider the fighting pilots and observers, but also all officers who were on other details just as dangerous, tedious and often requiring a greater amount of skill and practice, though not as spectacular. The work of the pilots and observers in the Day and Night Bombardment Squadrons, Observation and Reconnaissance Squadrons, and Balloon Companies which included artillery control and photograph work will now be reviewed and appropriate awards made in the form of ratings, carrying an increase in flying pay.

Named for Preferment

At a meeting of the Board convened Feb. 8, 1919, the following Air Service officers were recommended for the ratings Junior Military Aviator or Military Aviator to rank as such from the dates set opposite their names:

First Lieut. Louis G. Bernheimer, J. M. A., Aug. 11, 1918; Capt. Douglas Campbell, M. A., May 28, 1918; First Lieut. Wm. P. Erwin, J. M. A., July 15, 1918, M. A., Sept. 12, 1918; Capt. David McK. Peterson, M. A., May 15, 1918; Second Lieut. Earl W. Porter (observer), J. M. A., Aug. 9, 1918; First Lieut. Robert F. Raymond, J. M. A., June 24, 1918; Capt. Edward V. Rickenbacker, J. M. Reed G. Landis, M. A., Aug. 8, 1918; Lieut. Col. William Thaw, M. A., Feb. 15, 1918; First Lieut. Edgar G. Tobin, J. M. A., July 16, 1918; First Lieut. Donald B. Warner (bomber), J. M. A., Sept. 4, 1918; Second Lieut. John O. Donaldson, M. A., Aug. 10, 1918; Capt. Reed G. Landi, M. A., Aug. 8, 1918; First Lieut. James A. Keating, J. M. A., July 17, 1918, M. A., Aug. 8, 1918; Second Lieut. Frank B. Bellows (deceased), J. M. A., Sept. 13, 1918; First Lieut. Charles W. Drew (deceased), J. M. A., Aug. 15, 1918; Second Lieut. Roger Hitchcock (deceased), J. M. A., Aug. 11, 1918; First Lieut. Fred W. Norton (deceased), J. M. A., July 2, 1918; First Lieut. Edward Orr (deceased), J. M. A., Aug. 28, 1918; First Lieut. Merton L. Campbell (deceased), M. A., Aug. 13, 1918, and First Lieut. Lloyd A. Hamilton (deceased), M. A., Aug. 13, 1918.

Better Late Than Never

This belated recognition of Air Service pilots who have distinguished themselves at the front is an indication of the policy of the Director of Military Aeronautics to promote fliers for conspicuous service.

Committee on Public Information

Brig.-Gen. William Mitchell, A. S., A. E. F.

General Mitchell who is on his way back from overseas is shown in the picture standing by a surrendered German airplane. He was recently made commander of the Legion of Honor with General Pershing and nine other American officers. He is to be assigned to an important position in the Air Service on his return.

General Menoher at His Old Home Town

On a recent leave of absence Major Gen. Charles T. Menoher, Director of the Air Service, visited Johnstown, Pa., where his mother, who is 87 years old, is still living. It was an "Old Home Week" for the General. The State Legislature adjourned on Friday, Feb. 7, in his honor, and Governor Sproul attended exercises celebrating General Menoher's return. On this occasion the General was presented with a handsome silver service from the people of his native city. It was a gala-week end for the General, who made six or eight speeches in the course of his brief stay.

Three planes from Bolling Field, Washington, made the trip to Johnstown to take part in the ceremony. The General said that the enthusiasm of the people and the extent of the courtesies extended to him were surprising, and he noted with special interest that the sympathy of the whole countryside seemed to be with the boys in France, and that they were fired by the one idea of defeating the Boche. There was an apparent lack of German influence and sympathy in this neighborhood, the General noticed.

Of course, it was a great day for Mrs. Menoher, the mother of this brilliant and distinguished officer who had just returned from overseas to head the Air Service. It was with great pride that she told of his service and the fact that she had besides her son, four grandsons who were officers in the American service, and four grandsons who were enlisted, two of the latter serving in the Aviation section. Two of the grandsons, of course, were General Menoher's sons, Major Pearson Menoher and Lieut. Darrow Menoher.

General Menoher Receives Decorations

General Menoher recently received through the State Department, two medals from the French Government. One of them conferred the rank of Commander of the Legion of Honor, and the other was a Croix de Guerre with palm. The citations to accompany these medals have not yet been received.

London to Paris 1 h. 50 min.

The British Air Ministry announces that a British service machine on Feb. 12 made a record flight between Paris and London, covering the distance in one hour and fifty minutes.

Official Magazine For Air Service

There has just been issued at Washington the first number of *U. S. Air Service*, the official publication of the Air Service Clubs' Association, Major-Gen. William L. Kenly, president. The magazine presents an attractive appearance and contains articles from such well-known authorities in their particular lines as Orville Wright, Col. William Thaw, Major Charles J. Biddle, Holworthy Hall, in addition to salutations from the Secretary of War, the Secretary of the Navy, and an article by Major A. A. Cunningham, Commandant of the Aviation Section of the Marine Corps. There is also an important contribution by Lieut.-Col. T. E. Gillmore of the British Aviation Mission.

The magazine is 7 x 10 in., contains 32 pages, and is profusely illustrated. It is printed on super paper, with 120 screen half-tone, and the body of the text is in 10-point type. Editorially it is pointed out that the object of the magazine is to make it of real value as a medium for the exchange of views among men in the Air Service and as a means of presenting their views to the manufacturers. The Navy and Marine Corps have recently announced their desire to join the association, so that *U. S. Air Service*, beginning with its second number in March, will represent the aviation interests of the Army, Navy and Marine Corps, and the name of the association will be changed on Feb. 13, in accordance with this program. A Navy man will be appointed associate editor.

The magazine is published under the supervision of the Board of Control of the Air Service Clubs' Association.

The editorial staff is made up of the following: Capt. Earl N. Findley, editor-in-chief; Capt. H. I. Brock, managing editor, and Capt. Horace Green, Capt. Harford W. H. Powel, and Lieut. Reid F. Benham.

Lieut. Col. Castle Going Overseas

Lieut.-Col. B. F. Castle has been designated to represent the AIR SERVICE as a member of the War Department Liquidation Committee, headed by Judge Robert Parker. Thus far Col. Castle is the only Army officer named for this commission. He will leave for overseas shortly to engage in this important work.

OVERSEAS A. S. COMMANDERS ON NOV. 11

Major Gen. Mason M. Patrick Was Chief of the A. E. F. Airmen

MITCHELL IN ADVANCE ZONE

Authoritative List of the Heads of Various Air Service Organizations Abroad When Flying Stopped

About the time of the signing of the Armistice, the American Air Service overseas was commanded by Major-Gen. Mason M. Patrick, Chief of Air Service, A. E. F., Headquarters, Tours. He had two chief assistants: Brig.-Gen. William Mitchell, Assistant Chief of the Air Service, Army Group, of Zone of Advance, and Brig.-Gen. Benjamin D. Foulois, M. A., Assistant Chief of the Air Service, Service of Supply.

On November 6, the chief of the Air Service, First Army, was Col. Frank P. Lahm, J. M. A.; the chief of the Air Service, Second Army, was Col. Thomas DeW. Milling, M. A.; when the Third Army Air Service was organized Brig.-Gen. Mitchell took command and on January 8, 1919, was stationed in Coblenz, Germany.

Colonel Milling was chief A. S., First Army, at Orquevaux, on January 8, 1919, and Colonel Lahm was chief of the A. S. Second Army, at Toul.

Colonel Charles deF. Chandler, J. M., Aeronaut, was head of the American Balloon Service, A. E. F.

In Italy the Headquarters of the American Air Service was at Rome, where Major Robert Glendenning was in command.

In England the Headquarters Air Service, Base Section No. 3, was under the command of Col. C. R. Day.

Paris Headquarters were under the command of Lieut.-Col. H. Dunwoody.

Col. Aubrey Lippincott commanded the Air Service Replacement Barracks at St. Maixent, where the complete organization and equipment of the squadrons was carried out, except the 'planes which were flown to the advance stations by the pilots from Orly, the Aviation Acceptance Park, commanded by Col. T. A. Baldwin.

Lieut.-Col. Hiram Bingham was in command of the 3d Army Instruction Center, at Issoudun, the largest flying school in the world, having fourteen fields.

Col. W. G. Kilmer, J. M. A., was chief of Training, Headquarters Tours. Lieut.-Col. E. V. Sumner was in charge of Air Service Production Center, No. 2, at Ramorantin.

Colonel Whithead was chief of staff for the Air Service at G. H. Q. November 11, 1918.

Seeking Photographs of Aviators

The Director of Military Aeronautics desires to have photographs of the officers named below, who were killed in airplane accidents, and for whom fields of the Air Service have been named. So far it has been impossible to get in touch with any relatives or friends of these men, all of whom died several years ago and whose records in the War Department are incomplete.

Accordingly it is desired, if this comes to the attention of any one acquainted with these men or with their families, that the necessary information be furnished the D. M. A., attention Personnel Section, in order that an effort may be made to procure photographs: Lieut. Moss L. Love (Cavalry); Lieut. Joseph D. Park (Cavalry); Lieut. Lewis C. Rockwell (Infantry); Lieut. Lewis W. Hazelhurst, Jr. (Signal Corps), and Lieut. Eric L. Ellington (Cavalry).

WANT WEIGHT CARRYING, SAFE AIRPLANES

P. O. Department About to Call on Manufacturers and Inventors

LANDING ABILITY REQUIRED

Specifications for Bids on Changing DH-4s and the Curtiss R 4-L and JN-4H and the Standard JR-1

The Post Office Air Service is now preparing a circular which it will put out in about two weeks calling upon manufacturers and inventors for ideas and suggestions for a suitable airplane to be used as a mail carrier.

Some of the requirements for this machine are safety, weight carrying capacity and landing ability. It will not call for the military attributes of excessive speed or climbing power.

By landing quality is meant the ability to land within a small circumscribed space.

Suggestions will be asked for wind brakes, for twin, triple or other engines that will give the desired power.

The airplanes should have a mail capacity of 1500-2000 pounds or more.

The P. O. Department has modified a DH-4 (as per specifications herewith) and will call for bids, etc.

The P. O. Department is also preparing specifications for the modification for its purposes of the Curtiss R4-L and JN-4-H and also the Standard J R-1.

Sealed proposals, f.o.b. factory, subject to the usual conditions, will be received at the P. O. Department until 2 p. m. Feb. 26. The specifications are:

Changing and modifying 12 De Haviland 4 aeroplanes, and as many more up to 60, in lots of 12, as the Postmaster-General may direct. The changes to be made may be determined by inspecting a sample plane at the mail aviation field at Belmont Park, Queens, Long Island, New York, which may be surveyed and compared with the DH4 battle planes, a specimen of which may also be found at the aviation field.

The changes comprehend the following, and such other changes as may be shown in said remodeled DH4 plane at Belmont Park aviation field:

1. Pilot cockpit to be moved to rear.
2. Longerons on fuselage to be reinforced with 1-32-in. steel channels from front engine plate to rear of pilot's cockpit.
3. Longeron splices to be reinforced with steel plates.
4. Upper engine section wire to be increased in size and fittings reinforced with metal straps running diagonally from upper to lower longerons.
5. 1-32-in. steel reinforcing strip to be replaced on sides of fuselage from lower reinforcing strip to center sections fore and aft wires.
6. Bulkheads to be reinforced with cross bracing.
7. Mail compartment to be finished with 3-16-in. three-ply veneer and suitable covers and straps.
8. Turtleback to be better stream-lined from rear of pilot's cockpit to stabilizer.
9. New cowling to be provided from engine to rear stabilizer.
10. All outer struts to be pinned with bolts.
11. To be fitted with stronger landing gear and same placed forward of old position, as per sample plane.
12. Bracing wires to be installed on elevators and rudders.
13. Stabilizer under brace to be tightened with bolts instead of pins.
14. Fitting at front lower longeron to be strengthened to take load of upper drift wire off wood by making fitting to go around longeron.
15. Rudder to be so arranged as to give plenty leg room.
16. Two pressure gasoline tanks and gravity tank totaling 130 gallons to be installed.
17. Instrument board to be placed as in sample DH4 now at Belmont Park.

Delivery—The time for delivery of work should not be longer than four weeks from date of award for six of the machines, the second lot of six to be delivered within two weeks thereafter.

The Department will deliver the ships to and from factory.

Milwaukee Flying Club Officers

Frederick Bock has been elected president of the Milwaukee Flying Club. The other officers are: vice-president, A. Puerzer and H. Gatknecht; secretary-treasurer, Frank G. Gregory; directors, H. G. Montague, John Boesch, Frank Zickular, W. Danishefsky and H. Grunze.

B. Russell Shaw, Aeronautical Engineer

B. Russell Shaw was born in Coshocton, Ohio, October 13, 1890, being a descendant from the "House of Shaws" of England. After completing his course in education in the local schools, he took up technical work in engineering under private tutors of distinction. He has a private library of great value, containing technical notes, photographs and descriptions of practically every aeroplane and lighter-than-air craft.

Mr. Shaw's interest in aviation dates from 1906, when he built his first model of an aircraft. A few months later he learned that several French scientists of note had previously developd this same principle and had likewise experienced failure. They had termed the design "Helicopter." Following this, Mr. Shaw conducted several experiments with small dirigibles and balloons.

In 1909 Mr. Shaw decided to produce a biplane similar to the "June Bug" which had been recently tested by Glenn H. Curtiss at Hammondsport, New York. Early in 1910 this machine was completed in Newark, Ohio, and shipped to the aviation meet held at Indianapolis, Ind., in June.

In the Fall of 1910 Mr. Shaw received an order from an Indianapolis sportsman and constructed a biplane, followed by a duplicate for his personal use. The work of building the aeroplanes in every detail, was done by Mr. Shaw. They were built after the general design of the Curtiss Rheims Racer.

In 1913 the Shaw Aeroplane Company was incorporated in Indianapolis, Indiana, and work commenced on a flying boat designed by Mr. Shaw.

In the latter part of 1914 a contract was let to the Shaw Aeroplane Company for a high speed monoplane, to be equipped with a water cool motor. Mr. Shaw designed the machine which was later known as "The Shaw-Morane Monoplane" and was one of the first of this type to be built in this country. Then Mr. Shaw became affiliated with the Wright Bros. at Dayton, Ohio.

In November of 1916, after the forming of the Wright-Martin Aircraft Corp., he was transferred to the engineering department of that concern in New York City.

In April of the following year he was placed in charge of the experiment department at New Brunswick, N. J., where a series of the first official flights of the American made Hispano-Suiza motor were made under his direction. The American copy of the Franco-British Flying Boat was completed also under Mr. Shaw's direction. It was later flown by Caleb Bragg at his Port Washington Station, Long Island. With this same machine Mr. Bragg succeeded in winning the Aero Club trophy for the longest hydroplane flight in 1917.

In April, 1918, Mr. Shaw entered the services of the United States government at McCook Field, Dayton, Ohio. For some time he assisted G. L. McCain, formerly of the Packard Motor Car Co., with the development of the famous Liberty motored U. S. D9A Bombing and Reconnaissance machine. Later Mr. Shaw was placed in charge of the tests of all types of Foreign and Domestic airplanes, under Capt. Bragg, as Assistant Director of Flying. During this time he gave the Government valuable assistance, made so by his years of practice and theory. It was brought to his attention on numerous occasions the need for an instrument that would correctly indicate the rate of ascent and descent of aircraft. This resulted in the designing and perfecting of an instrument, by him, which has been termed the "Vertimeter."

At the present time, in conjunction with his consulting work, Mr. Shaw is actively connected with the Aeronautical Instrument Co., which is producing the Vertimeter, with offices at 32 East Twenty-third street, New York City.

HOW TO APPLY FOR CIVILIAN LICENSES

Several Important Changes Have Been Made in the Form

NATURE OF PROJECT ASKED

Precautions to Keep Out Irresponsible Promoters or Incompetent Pilots Taken by the Cognizance Board

Several important changes have been made in the form application for license to fly civilian aircraft since it was printed in the AIR SERVICE JOURNAL (Feb. 1). As finally approved it is as follows:

APPLICATION FOR LICENSE TO FLY CIVILIAN AIRCRAFT

License for flying civilian aircraft is desired under the following terms and conditions:

License to be issued to....................
Address ....
Owner .... Address............
To be operated by..........................
Address ....
Date of first solo flight made by pilot.......
Date of designation as Reserve Military Aviator or Naval Aviator (and number).......
Service in the U. S. Army or Navy..........
(*An authenticated copy of a certificate or license as evidence of pilot's qualifications must be submitted.*)
Passengers to be carried...................
Description of aircraft....................
Condition of planes........................
Present number of hours each plane has been flown ....
Description of motors......................
Condition of motors........................
Present number of hours of each motor......
Means to be taken to insure upkeep of planes and reliability of motors...............
....
Number of mechanics to be employed........
Purpose for which flights are to be made:
....
Nature of aerial project to be organized (should be supplemented by statement in full) ....
Financial backing available to initiate and sustain project (should be supplemented by evidence and reference)................
....
References:
Name............. Address..............
Name............. Address..............
Name............. Address..............
Territory in which flights are to be made:
....
License to be valid from........to........
Signature of applicant........Date.........

This application after being properly executed should be sent to

THE JOINT ARMY AND NAVY BOARD ON AERONAUTICAL COGNIZANCE,
Bldg. "D," 6th & B Sts., Washington, D. C.,
L. G. Haugen, 1st Lieutenant, A. S. A., Secretary.

INSTRUCTIONS TO LICENSEE

(1) All licensed aircraft shall display the license number in contrasting colors placed as follows:

Heavier-than-air craft: On the upper surface of each upper wing and the under surface of each lower wing.

Lighter-than-air craft: On the upper half and the lower half, on opposite side from upper number.

All numbers will be five feet in height and nine inches in width of line, unless chord of wing is less than five feet, in which case height of numbers will equal wing chord, with above proportion of width of line.

(2) A monthly report is required from the holder of this license, giving the date, duration and number of flights made by the aircraft of this license number.

(3) This license is issued by the Board and accepted by the licensee on condition that same may be revoked at any time the Board considers it necessary or desirable to do so.

British Ship Ready to Fly the Atlantic

According to the London *Chronicle's* Glasgow correspondent the British airship which is to attempt a transatlantic flight is now practically complete and awaiting favorable weather conditions for departure. The ship was built by an important armament firm near Glasgow and would have been completed before this but for the interruption caused by the recent strike. A representative of the firm said the airship would have been away and probably back again but for the labor troubles. The vessel is the R-33, a sister vessel to that being constructed by Messrs. Armstrong, Whitworth & Co.

10,000 FLIERS TRAINED IN ONE YEAR

Col. Milton F. Davis Tells of Work at the Flying Fields

BUILT UP BY YOUNGSTERS

Appreciation of the Wonderful Efforts of Field Commanders, Instructors and Enlisted Mechanicians of the A. S.

The following letter from Col. Milton F. Davis, to Major Gen. Wm. L. Kenly, Director of Military Aeronautics, is reproduced for general information. Colonel Davis has been assigned to the office of Directors, Air Service.

> On leaving my duties as Chief of Training under your supervision, I desire to call your attention to, and to express in some way my appreciation of, the no less than remarkable accomplishments of our Flying Fields during the year ending November 11, 1918. . . .
>
> Now that the war is over and the rush of training activities has ceased, we may take time to look back over the past eighteen months and calmly survey the remarkable results attained by our Training Schools during that brief time. Before taking up his new duties, the Chief of Training desires to express his commendation and praise of the splendid work done by the Field Commanders, their administrative staffs and the remarkable body of young fliers who have produced greater results in less than a year than any other nation has done in thrice the time.
>
> *10,000 Fliers Trained in One Year*
>
> During the hurry of training and preparation of troops to lick the Hun, few people took time to consider the really marvelous work that was being done at the Flying Fields of the United States; and few, if any, outside of the Air Sersive—as a matter of fact many *in* the Air Service—have any conception of the magnitude of the U. S. Air Service on November 11, 1918.
>
> The National Defence Act, authorizing and expanding the Aviation Section of the Signal Corps and appropriating the famous $640,000,000 was passed July 27, 1917. At that time America was unknown in the air. She had a few old ships that had been battered around in the Mexican Expedition, one lonesome squadron and a detachment. There were no airplanes and no factories in which to make them. There were no Flying Fields and but a few civilian Flying Instructors whose time in the air was counted by minutes instead of hours. From practically the absolute zero of arithmetic, the Air Service started to grow Aug. 1, 1917. In one year its accomplishments are almost beyond comprehension; they are so well known that a repetition of figures is not considered necessary here. Suffice to say that in that one year the United States had trained ten thousand fliers, and the daring and initiative of our Field Commanders and their assistants had reached such a point that, at the signing of the Armistice, a Colonel of the British Air Service feelingly expressed the idea that, had the war continued a little longer, the Allies would have been coming to us to learn the art of flying and fighting in the air.
>
> *Built Up by Youngsters*
>
> The world-wide results that have been thus accomplished have been done by a bunch of youngsters who, in times of ordinary peace with its slow promotion, would be Second and First Lieutenants. These young officers, who have been responsible for this splendid work and the wonderful reputation of our training system, have built it up on their own intiative by endless and gruelling grind and in spite of restricting regulations and, only too often, of lack of co-operation of powers higher up. Youthful Majors and Lieutenant Colonels have performed the work, and handled the commands of Brigadiers and Major Generals; and have done it to the unqualified satisfaction of the Chief of Training. The greatest pride of his life is to have been associated with this bunch of live-wire young officers during their splendid work. Difficult problems have arisen which, in many cases, they have proceeded to solve without authority, but always with the one idea in view—to do the work and lick Germany.
>
> *Tribute to Enlisted Men*
>
> The undersigned desires to express his boundless appreciation of the wonderful service rendered to the country by the corps of Field Commanders, Instructors and enlisted mechanicians of the Air Service in America, and to commend and thank them for having done so much in helping to bring the war to a speedy termination. The nation is especially indebted to the personnel of the trained enlisted force of the flying fields, who, with little hope of getting overseas, have worked unceasingly, almost night and day—at most fields sixteen hours was an average day's work—to keep ships in the air. These men for a soldier's pay have continuously, and without complaint, done twice the amount of work each twenty-four hours that any civil organization would have dared ask of its employees. Their work and splendid spirit is more than appreciated; and is characteristic of America's sirit in the war.
>
> MILTON F. DAVIS,
> Colonel, A. S. A.,
> Late Chief of Training.

Lt.-Col. Ira Longanecker, A. S. A.

The Commanding Officer of Chanute Field, Lt.-Col. Ira Longanecker, has had an interesting military career, and his work since coming into the Air Service has brought him deserved promotions. He enlisted in the Infantry in the fall of 1902; commissioned from the line, 1906, and served with the Infantry from that time until detailed to the Aviation Section of the Signal Corps in December, 1917. During line service he spent two years in the Philippines, four years and a half in Honolulu and several months on the border just prior to Villa's last raid. His Company held the left of the American line at Douglas during Villa's attack on Carranza's troops at Aguapriet opposite Douglas in 1915.

Lt.-Col. Longanecker was detailed to Aviation Section, S. C., December, 1917, reported to Headquarters in Washington and served there until detailed to Gerstner Field, La., April, 1918; served as executive officer until July, 1918, and assumed command of the Field upon Major Kirby being ordered over-seas. In command of the Field until November 10, 1918. Ordered to Selfridge Field, Michigan, in command until November 20, 1918. Ordered to Washington, November 20, 1918, and served on Committee for organization of Air Service in Peace Time. In command of Chanute Field since January 20, 1919.

When and Where to Wear Spurs

According to a change in Special Regulation No. 41, Uniform Regulations, 1917, spurs will always be worn with boots whether mounted or dismounted, with the following exceptions: (a) Aviators will not wear spurs when flying; (b) spurs will not be worn with field boots by officers when on dismounted duty.

CURTISS AT BUFFALO NOW ON SOLID BASE

Vice-President James E. Kepperley to Remain in Charge

TELLS OF ACHIEVEMENTS

Henceforward the Business Will Be in Process of Building-Up Instead of Disintegration

Hereafter the making of Curtiss airplanes in Buffalo will be centered in the Churchill street plant. The force of 3,200 men, all that are left of the 12,000 men employed when the war ended, will be reduced to 1,800. The Bradley street, Austin street, Niagara street and South Elmwood avenue plants are closed. The factory at Hammondsport is now idle and is offered for sale.

While this further reduction in force is unwelcome news for Buffalo, there is, in a way, relief in it because it means that the Curtiss readjustment following the cancellation of war contracts will be ended in February and that the airplane factory here will soon be on a bed rock basis. Keen observers say there is a future for the commercial airplane and have faith that the factory will become again one of Buffalo's permanent industries.

Employees Find Other Jobs

Those who are being released this week have known what would happen for a month or more, the company says, and most of them have secured other work. Some have not lived in Buffalo long, being brought here by the glitter of war pay, and these have returned "home."

James E. Kepperley, vice-president and general manager of the Curtiss Aeroplane & Motor Corporation, will remain in charge, it is announced. None of the officials are leaving.

Mr. Kepperley was the guest of honor at a dinner last week at the Hotel Lafayette, Buffalo. The event was given by the members of the vice-president's executive staff and the department managers. It marked the close of the war work in the Curtiss plant and the opening of peace-time production.

In appreciation of the chief executive's leadership, W. M. Moss, comptroller of the company, gave Mr. Kepperley in the name of the Curtiss employees a gold watch with a chain of gold and platinum. J. A. Callahan, manager of the Churchill group of plants in Buffalo, presented to the general manager engrossed resolutions signed by all the department heads and their assistants.

Kepperley Tells of Achievements

"Buffalo can be proud," Mr. Kepperley said, "of the part that your workers of the Curtiss family have accomplished. Before the United States entered the war, Curtiss furnished the Canadian Government with all of its air equipment and built a large part of the naval and air-training equipment of the British forces. When America went into the war, Curtiss started on an expanded programme, and we are proud that we have, during the war, furnished our Government 80 per cent of all the training planes of all kinds it received; 55 per cent of all training motors from the little plant at Hammondsport and the other 45 per cent from our allied company, the Willys-Overland, and, in adition, sending from Buffalo 90 per cent of all the fighting boats and other naval aerial equipment which the United States navy had during the war."

Work on naval contracts is now being completed at the great North Elmwod factory, which was built for the war business. The board of directors of the Curtiss company have not yet decided on the final disposition of this plant.

$20,000,000 for the Army Air Service

Here is that part of the Army Appropriation bill relating directly to the Air Service, reported out by the committee:

AIR SERVICE, MILITARY

Creating, maintaining, and operating at technical schools and colleges, and at established flying schools, courses of instruction for aviation students, including cost of construction, equipment, and supplies necessary for instruction and subsistence of students, and excluding pay of military instructors and extra pay allowed candidates for commission (cadets) while at flying schools; extra pay allowed candidates for commission (cadets) while at flying schools; vocational training in trades related to aviation, including the employment of necessary civilian instructors, purchase of tools, equipment, materials, machines, textbooks, books of reference, scientific and professional papers, and instruments and material for theoretical and practical instruction at aviation schools; purchase of supplies for securing, developing, printing, and reproducing photographs made by aerial observers; purchase of aviation supplies and equipment to be furnished Air Service organizations to be established during the year, and to maintain and replace the equipment of organizations already in service; establishment, enlargement, equipment, maintenance. and operation of aviation stations, balloon schools, fields for testing and experimental work, including the acquisition of land or any interest in land, by purchase, lease, condemnation or otherwise; improvement of such land, and making same suitable for the purpose intended; procuring and introducing water, electric light and power, telephones. telegraphs, and sewerage; purchase of stoves and other cooking and heating apparatus. kitchen and table ware, and furniture and equipment for kitchens, mess halls, officers quarters, barracks, hospitals, and other buildings, screens, lockers, refrigerators and all other equipment; purchase, manufacture, and installation of all kinds of machinery, tools material, supplies and equipment for repair and maintenance of aircraft, buildings, and improvements of aviation stations and balloon schools, and testing and experimental stations, or property or appliances used in connection with aviation at home and abroad; payment of mileage to officers of the Army traveling on duty in connection with aviation; salaries and wages of civilian employees in the District of Columbia or elsewhere as may be necessary, and payment of their traveling and other necessary expenses: actual and necessary expenses of officers and enlisted men, and civilian employees of the Army, and authorized agents sent on special duty at home and abroad for aviation purposes, including observation and investigation of foreign military operations and organizations; experimental investigation, and purchase and development of new types of aircraft; necessary expenses incidental to the administration of the Air Service; all damages to persons and private property resulting from the operation of aircraft at home and abroad, $10,000,000: *Provided,* That claims not exceeding $250 in amount for damages to persons and private property, resulting from the operation of aircraft at home and abroad, may be settled out of the funds appropriated hereunder, when each claim is substantiated by a survey report of a board of officers appointed by the commanding officer of the nearest aviation post, and approved by the Director of Military Aeronautics: *Provided, however,* That the claims so settled and paid from the sum hereby appropriated shall not exceed in the aggregate the sum of $150,000.

AIR SERVICE (PRODUCTION)

Aerial appliances, vocational training in aviation, and so forth: For the purchase, manufacture, maintenance, repair, and operation of airships, war balloons, and other aerial machines, including instruments and appliances of every sort and description necessary for the operation, construction, or equipment of all types of aircraft, and all necessary spare parts and equipment connected therewith; and all necessary buildings for equipment and personnel in any bureau of department charged with the production or procurement of aeronautical equipment and material; and also for the establishment, enlargement, equipment, maintenance, and operation of fields for testing and experimental work, including (a) the acquisition of land, or any interest in land, with any buildings and improvements thereon, by purchase, lease, donation, condemnation, or otherwise, $10,000,000: *Provided,* That by order of the President any Government property or unappropriated or reserved public lands may be reserved from entry, designated, and used for such fields for testing and experimental work; (b) the improvement of such land by clearing, draining, seeding, and otherwise making the same suitable for the purpose intended; (c) procuring and introducing water, electric light and power, telephone, telegraph, and sewerage to testing or experimental fields and buildings and structures thereon by the extenson of existing systems or the creation of new systems and their maintenance, operation, and repair, installation of plumbing, electric fixtures and telephones, fire apparatus and fire-alarm systems, and the maintenance, operation, and repair of all such systems, fixtures, and apparatus; (d) purchase of stoves and other cooking and heating apparatus, kitchen and table ware, and furniture and equipment for kitchens, mess halls, offices, quarters, barracks, hospitals, and other buildings, screens, lockers, refrigerators, and all other necessary equipment; (e) purchase and manufacture and installation of all kinds of machinery, tools, material, supplies, and equopment for construction, maintenance, and repair of aircraft, buildings, and improvements at testing and experimental stations, or property or appliances used in connection with aviation.

And also for the purchase or manufacture and issue of special clothing, wearing apparel, and similar equipment for aviation purposes.

And also for the actual and necessary expenses of officers, enlisted men, and civilian employees of the Army and authorized agents sent on special duty at home and abroad for aviation purposes, including observation and investigation of foreign military operations and organizations, manufacture of aircraft and engines; also special courses in foreign aviation schools and manufacturing establishments, to be paid upon certificates of the Secretary of War certifying that the expenditures are necessary for military purposes.

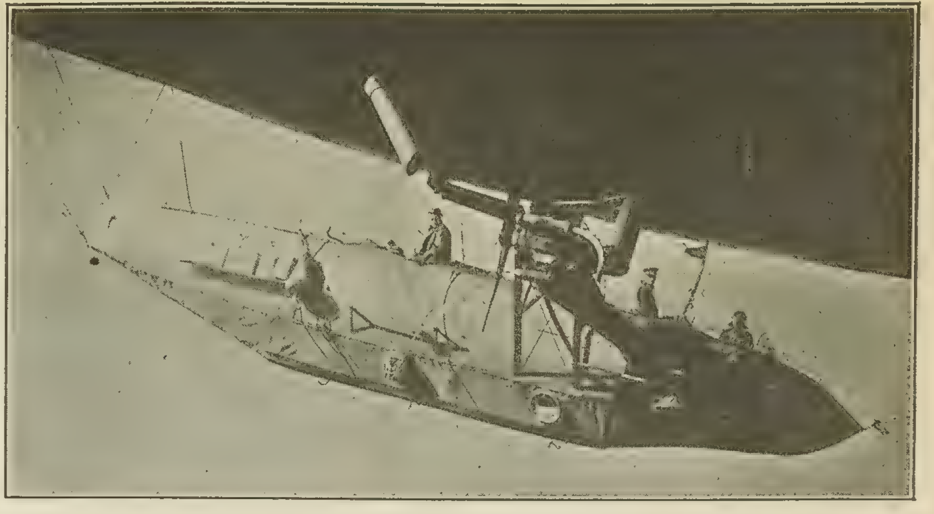
And also, for vocational training, including employment of necessary civilian instructors in important trades related to aviation, purchase of tools, equipment, materials, and machines required for such training, purchase of textbooks, books of reference, scientific and professional papers, periodicals and magazines, and instruments and material for theoretical and practical instruction at aviation schools and stations, and all other means to carry out the provisions of section 27 of the Act approved June 3, 1916, authorizing, in addition to the military training of soldiers while in active service, means for securing educational and vocational training of a character to increase their military efficiency and enable them to return to civil life better equipped for industrial, commercial, and general business occupations.

Also, to pay such civilian employees in the District of Columbia or elsewhere as may be necessary, and for the payment of their traveling and other necessary expenses.

That hereafter mileage to officers of the Army traveling on duty in connection with aviation shall be paid from the appropriation for the week in connection with which the travel is performed.

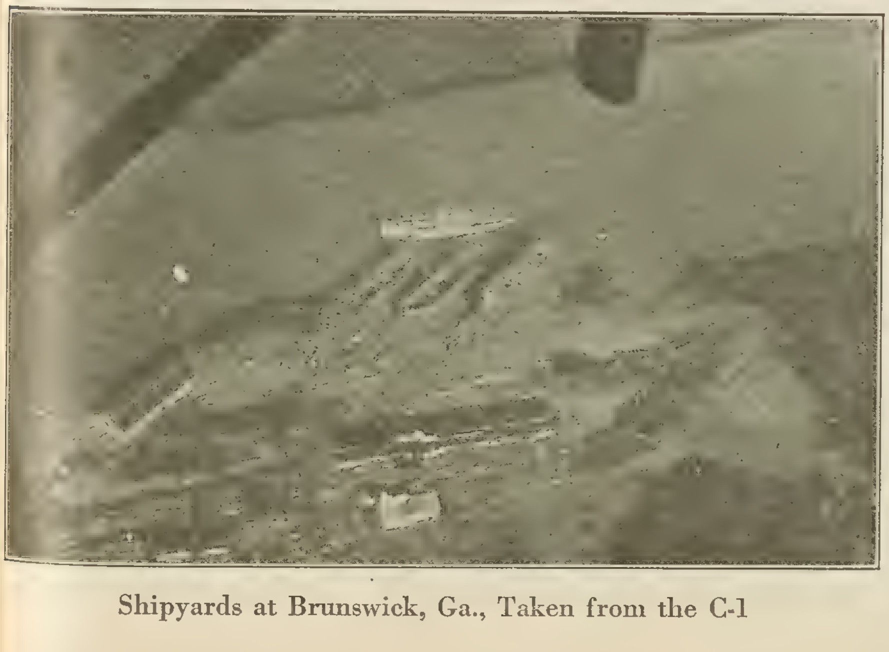
And also, for the payment of all expenses in connection with the development of suitable types of aviation engines, airplanes, balloons, and other aircraft appurtenances, including the cost of sample engines, airplanes, balloons, and appurtenances, cost of any patents and other rights therein, and cost of investigation, experimentation, and research in respect thereto.

And also, for the payment of all expenses in connection with the creation, expansion, acquisition, and development of plants, factories, and establishments for the manufacture of airplanes, aircraft balloons, engines and appurtenances.



The U. S. Navy Dirigible C-1, Which Flew from Rockaway Point, L. I., to Key West. The Following Officers Manned the Boat: Capt. S. V. Parker, Lieuts. S. J. and J. B. Lawrence, Ensign E. B. Packard, Ensign Hanson, Gunner W. D. Medusky, C. M. M. G. E. Ritter and Q. M. 1 c. George Du Bon

Palm Beach, Fla., Taken from the C-1



Shipyards at Brunswick, Ga., Taken from the C-1

U. S. Takes Over Cape May Land

Three hundred and forty-nine acres at Cape May, N. J., the ground on which are erected the naval air station and the submarine patrol base buildings and barracks, have been taken over by the Government.

Commander J. B. Patton, in charge of land for the fourth naval district, has notified the municipality to remove all its property from the reservation.

The price the Government is to pay will be fixed by an appraisal board.

Experimental Airplane Tests

Some of the conditions under which tests of experimental airplanes may be made were printed in the AIR SERVICE JOURNAL of Feb. 1. The complete regulations authorized by Major-Gen. Wm. L. Kenly are:

1. The Chief of the Technical Section is charged with the responsibility for all tests of experimental airplanes at Air Service Fields.

2. Requests by private enterprise for permission to conduct *Unofficial Tests* of experimental airplanes at Air Service Fields may be granted under the following conditions:

   (a) Such tests will be conducted at McCook Field, Dayton, Ohio, unless otherwise permitted by the Director of Military Aeronautics.

   (b) Such tests will be entirely at the owner's risk and expense and he shall supply the pilot therefor. No Air Service pilot will be permitted to engage in these tests.

   (c) Flight Tests will be permitted only after a Technical examination by a representative of the Technical Section. If, in the opinion of this officer, the airplane is unsafe to fly, no flight will be permitted at an Air Service Field.

3. *Official Tests* of experimental planes will be authorized only at McCook Field, Dayton, Ohio, and under the following conditions:

   (a) The owners of such airplanes must submit two models—one for destruction test and one for performance test.

   (b) Tests will be at Government expense and the flight test will be made by an Army pilot detailed by the Chief of the Technical Section.

   (c) Flight Tests will be permitted only after a technical examination and sand-test by a representative of the Technical Section, If, in the opinion of this officer, the airplane is unsafe to fly, no flight will be permitted at an Air Service Field.

4. Pilots inexperienced in flying experimental airplanes will not be permitted to fly such planes until after they have been placed "in production."

5. Commanding Officers at Flying Fields will be held strictly responsible that no flights are made at their fields in violation of the foregoing instructions.

LA GUARDIA ASKS FOR A UNITED AIR SERVICE

Our Services Are Overlapping in Experimental Work

NAVY APPROPRIATION BILL

Admiral Mayo Makes an Interesting Report on Aviation Activities in Great Britain and Germany

There was an interesting discussion over the Navy Appropriation bill in the House of Representatives on Feb. 6. The bill under consideration read:

Aviation, Navy: For aviation, to be expended under the direction of the Secretary of the Navy for procuring, producing, constructing, operating, preserving, storing and handling aircraft, establishment and maintenance of aircraft stations, including the acquisition of land by purchase, donation, or condemnation for erection of a factory for lighter-than-air machines; and for experimental work in development of aviation for naval purposes, $25,000,000; *Provided*, That the sum to be paid out of this appropriation under the direction of the Secretary of the Navy for drafting, clerical, inspection, and messenger service for aircraft stations shall not exceed $300,000; *Provided further*, That the Secretary of the Navy is hereby authorized to consider, ascertain, adjust, determine, and pay out of this appropriation the amounts due on claims for damages which have occurred or may occur to private property growing out of the operations of naval aircraft; *And provided further*, That no part of this appropriation shall be expended for maintenance of more than six heavier-than-air stations on the coasts of continental United States.

Mr. Padgett's Remarks

Mr. Padgett called attention to the fact that the original appropriation submitted was $225,000,000, while we were still at war. "After the armistice," he said, "when the bureau chiefs came before us they set forth in the hearings the demand and necessity as they estimated for $85,000,000, and the Secretary of the Navy in his hearing arbitrarily reduced that to $36,000,000. The committee in considering it has reduced it to $25,000,000. I want to say to the gentleman that I doubt very much if $25,000,000 will carry on the activities of the Navy with reference to the ships and the limited number of shore stations. We put in a proviso there limiting the shore stations to not exceed six in the continental limits of the United States."

Mr. Padgett then read a letter from Secretary Daniels detailing the purposes for which he asked the $35,000,000 appropriation and submitting a report on aviation by Admiral H. T. Mayo, from which these excerpts are taken:

PRESENT BRITISH POLICY

16. While the British Admiralty airship department has made no statement concerning a definite policy in the uses of the rigid airships that are being developed for British use, it appears that regular voyages of startling length are planned for these craft. A mail and cargo service connecting the British Isles, Canada, the British colonies in Africa, India and Australia appears to be the goal of the Admiralty policy. Surely such work is entirely within the scope of the air fleet that Britain is preparing.

17. In time of war these airships can be concentrated over any area of the seas surrounding English possessions to hamper hostile surface craft and to assist the Navy in its operations.

GERMANY'S AIRSHIP PROGRAM

18. The results already attained have justified the confidence felt by the German Navy in its airships when used in their proper sphere as the eyes of the fleet. Their Zeppelins did much to save the High Seas Fleet at the Battle of Jutland, to save their cruiser squadron on the Yarmouth raid, and were instrumental in sinking the Nottingham and Falmouth. Had the positions been reversed in the Jutland battle and had the British had rigids to enable them to locate it, they would probably have annihilated the German High Seas Fleet.

AIRSHIPS

19. At the present time Germany possesses apparently 50 efficient rigid airships built since 1915, in addition to a few nonrigids which she uses only for training purposes.

20. The Schutte-Lenz works, which build rigid airships, take about 12 weeks to build each ship. The maximum output of their factories is 1 ship every 16 days. Germany's total output of rigid airships would therefore appear to be 30 rigids a pear, or 1 every 12 days.

View of the City of Washington—monument in the foreground—taken from an airplane

SHEDS

21. The latest information shows that Germany has 54 housing and constructional sheds, capable of holding 71 rigid airships. This surplus of shed accommodation, placed all over the country, enables ships which can not get to their base after a long cruise to make for vacant berths where the weather conditions are more favorable.

BRITISH RIGID AIRSHIPS

22. While no other nation has done as well as the Germans in rigid airships, the British, alive to the need of maintaining sea supremacy, are closely competing. A few days ago they held acceptance trials of a 1,460,000 cu. ft. ship (the R-31), which made over 55 knots and could life 18 tons (or, say, 200 persons).

23. This ship turned in a complete circle of 0.7 mile diameter in three minutes. Another British ship now under way (R-38) will have a displacement of 2,750,000 cu. ft., a speed of about 70 knots, and a range of well over 200 hours, or safely across the Atlantic and return in any weathers except the worst storms.

24. The British, who, despite having shot down so many bombing Zeppelins are keenly aware of their utility, are embarked upon a construction program of 16 of modern type (besides smaller, now obsolete, types already in commission and used for training); the French have a similar program, calling for 8; it is understood the Italians are to construct 2; and our joint Army and Navy rigid-airship board has recommended that we begin with 4 for the Navy.

CONCLUSION

25. The development of the nonrigid airship is practically at a standstill, while the development of the rigid type is being pushed by Germany, France and Great Britain. The future of the rigid airship depends upon the ability of its designers to secure for it a superiority, relative to heavier-than-air craft, in radius, ceiling, climbing ability, and an approximation to the speed of the fighting planes.

H. T. MAYO.

MR. STAFFORD: "How did the committee arrive at the appropriation of $25,000,000?"

MR. PADGETT: "The committee reduced it to $25,000,000; but you will notice that we put in a provision that no part of this appropriation shall be expended for maintenance of more than six heavier-than-air stations in the continental limits of the United States. That would limit the scope of the operations for air stations. I think there are some 12 or 15 stations being operated now."

What Mr. La Guardia Said

Representative La Guardia spoke on the subject. Among other things he said:

"We want to build an air industry in this country. Most of this money, as the committee says, is for experimental purposes. The Army is going to come in with a bill in a few days asking for millions for experimental purposes. The services are overlapping in experimental work. We must prevent waste; we must cut down expenses. We will have waste as long as we go on duplicating work and expenditures. I want to say this for the naval air service: Its organization overseas was splendid. It had an efficient executive department. Their management was good. Their cooperation with this country was much better than ours in the Army. Now, the $2,000,000 which is suggested by the chairman for experimental purposes, for landing and taking off from ships, ought to be allowed. That is now purely in an experimental stage. In answering an inquiry made a few minutes ago, I will say: There is no difference between the motor for a machine that flies over water and one that flies over land. The air is just the same in both places. The best help we can give to aviation is not to squander millions. We must produce a true American motor, a true American plane. We can do it if you will give us a chance, but we will never do it when we have the Navy dabbling in it and the Army dabbling in it, and the Marine Corps dabbling in it and the Post Office Department dabbling in it. * * *

"One of the motors of naval planes is a low-compression motor. All kinds of motors are used for naval planes, same as land planes. It comes back to the question of the Liberty motor again. They wanted to utilize the Liberty motor for all machines. The big naval bombing machine, the coast-patrol mamachine, took the low-compression motor, because it was not necessary to go to such altitudes. Again, it was adapting the plane to the motor and not the motor to the plane. But when you have a light machine and do not need a 400-horsepower motor and want altitude and speed, why, or course, it will be just the same whether you fly over the land or over the water. The trouble is we are dividing this thing. We have four different departments overlapping. We took away $2,000,000 from the Post Office Department the other day. We have all these people dabbling in this, instead of having a comprehensive united air department taking up this subject for the Government and accomplishing results and developing a big aeronautical industry in this country. * * *

"Until we have a united air service in charge of competent technical men we must watch aviation appropriations. Let us take the money away from them until they come to their senses. When they come to their senses they will have to come together, and we will have an air department the same as England and France have. They can put it all over us in the air, from either the commercial or the military standpoint. They have got it on us. We must hustle to even catch up with European countries. Gentlemen, I urge the adoption of my amendment."

Consideration of the bill was continued.

Italy's Newspaper Air Delivery

The first aerial newspaper delivery in Italy was made on Feb. 2, when 1,000 copies of the Giornale d'Italia were transported by airplane from Rome to Naples, a distance of 120 miles, in an hour and a half.

Many machines constructed for war purposes are now being modified for commercial uses. An immense number of engineers, mechanics, and pilots have set to work on new aeronautic problems.

BIG QUESTIONS FOR PARIS AIR CONFERENCE

British Ready with a Proposal for the Peace Delegates

ESSENTIAL REGULATIONS

Brig. Gen. Mason Patrick, A. S., Dr. Wm. F. Durand, N. A. C., and Rear Admiral H. S. Knapp Our Representatives

The British Commission on International Control of Ports, Waterways, and Railways, is considering a proposed assertion of jurisdiction over aerial international flights. The British Air Ministry has prepared an elaborate convention which will be submitted to the Peace Conference.

The International Aviation Conference in Paris will also take up questions of great importance, such as how far national control of the air may go, passports, customs, reciprocal landing facilities, aerial police, and the settlement of damages. Civilian flights between nations are now impossible, because of the absence of essential regulations. Many enterprises, such as that of preparing a Paris to London air service, have been delayed in consequence.

The United States will be represented by Brig.-Gen. Mason Patrick, Dr. Wm. F. Durand of the National Advisory Committee on Aeronautics, and Rear Admiral H. S. Knapp.

CURRENT OPINION

Senator Thomas of Colorado: The expansion of aviation is one of the subjects which the Government should encourage in every direction. The three leading nations of Europe are applying their experiences in the war to the promotion of aviation not only for the carriage of the mail, but for its utilization in every possible commercial way. If we fail to pursue the same course, we shall very soon find ourselves as far behind in modern aviation as we were when Germany declared war against France. I believe that the development of aviation will, if properly pursued, result in the creation of an offensive and defensive system of warfare that will largely obviate the necessity of a continued coast defense and of a large Navy.

Senator Wesley L. Jones of Washington: I went up with Capt. Salmon, Col. Lee and Capt. Resnati. We turned over, went sidewise, careened toward the earth like a falling leaf, took the nose dive, went through the air like a wave on the face of the sea, and did all the other stunts learned by the men on the battle front. I did not get sick or dizzy. I was not afraid. I liked the sensation. The rides were too short. We came down too soon. I did not care so much for the stunts. I wanted some straightaway flying. I wanted to soar through the air and watch the earth go by and think. . . .

What the future of airplanes may be I can not say. The world's energy has been expended during the last four years in developing the aeroplane for war purposes. That development has been wonderful. If now directed to peaceful pursuits, passenger and commercial machines may be constructed so as to make their use for such purposes very desirable and economical.

I see by the papers the other morning that machines carrying 30 or 40 people are to be put on regular flights between Munich and Berlin. It looks like the practical German is going to put his war experience to commercial use, and I see no reason why we should not do the same. I understand a machine has been built in this country that will carry 50 passengers. Such a machine could certainly be made comfortable, and ought to be of considerable use in commerce aside from passenger travel.

CADET FLIERS TO RECEIVE BACK PAY

Special Division of Army Finance to Settle Claims

HOW TO MAKE OUT FORMS

Difference Between Amount Received and $100 a Month, Plus 50 Per Cent. for Flying Service

The decision of the Comptroller of the Treasury that there was no authority for the course of the War Department in reducing the pay of cadet fliers below the rate of $100 a month from April 1 to June 30, 1918, has entailed the readjustment of so many accounts that Brigadier General Lord, Director of Army Finance, has created a special division to care for them.

The result of the decision is that all cadet fliers are entitled to recover back pay for anything less than $100 a month paid to them during that period. From that time their pay is that of private, first class, $33, plus 50 per cent for flying service, or $49.50 a month. If aviation students have not received as much as those amounts they are entitled to secure the difference either through their company commanders or by writing to the Director of Finance, Munitions Building, Washington, D. C. The division will send express directions to each applicant telling him what he must do to obtain his back pay. It will involve the production of the applicant's discharge certificate, if he has been discharged, and the making of an affidavit as to the difference due him.

Official Notice

Many applications have been received, and they are disposed of very promptly. During the past week more than 500 papers on the subject were received at the special division. Here is the official notice:

(NOTICE.)

Candidates in training for commission in the Air Service within the period April 1-June 30, 1918, are entitled to the difference between the pay they then received and pay at the rate of $100.00 per month. Cadets on flying status are entitled to an additional 50% of the first-class privates' pay they received beginning July 1, 1918.

Official Forms

Forms to be filled out by the applicant follow:

1. With reference to your claim of......, it is requested that the inclosed affidavit be executed in duplicate and *returned to The Director of Finance, Munitions Building, Washington, D. C., attention Room No.* 3202, *in order that your claim be considered with a view of settlement being made thereon.*
2. You should be careful to fill in each space, stating each station that you were on duty and the period. That part of the affidavit which does not apply to your case should be lined out.
3. The inclosed affidavit should be sworn to before a Notary Public, Postmaster, or other City or State official who is authorized by law to administer oaths, or a Summary Court Officer, in duplicate.
4. It is suggested that you obtain the services of your local Postmaster in the preparation of this affidavit and that the greatest care be taken in filling out the spaces thereon.
5. If you are making claim for 50% increase for aviation as authorized by law, it will be necessary that you obtain and inclose herewith special order in duplicate placing you on flying status and also send the inclosed certificate stating that you were on duty requiring frequent participation in aerial flights and that during such period you did participate in regular and frequent flights.
6. If original final statement was issued to you and for any reason you have not cashed it the same should be forwarded to this office with your affidavit. In case you have received no final statement this office should be advised of this fact.
7. It is requested that you forward your discharge certificate as enlisted man, to this office with affidavit and it will be returned to you as soon as possible.

By authority of the Director of Finance.

.... }
.... } ss.

I, ..., former Private 1st Class, Signal Enlisted Reserve Corps, do solemnly swear that I performed duty as a cadet in training for commission in the United States Army at................. for the period from.................... to ....; at.............. for the period from.................... to ....; and at............ from................. to ...., date of discharge to accept commission; that I received pay at the rate of $........ per month for the period from........... to...............; $75.00 per month from .... to.................; and $.......... per month from......... to............; that I should have received $100.00 per month from................. to..................; that I should have received 50% increase pay for aviation as authorized by law from.................. to.................... payment of which has not been received by me; that I will therefore entitled to the difference between $........... and $100.00 per month from .... to.............., and the difference between $75.00 and $100.00 per month from...................... to...........; also 50% increase pay for aviation for the period above stated; that I was serving in my...............enlistment period; that I was discharged at.......... and that I cashed my final statement at .... on...............; that I have made no prior application for the amounts included in this affidavit and that I understand that fraudulent statements contained herein will subject me to prosecution.

....

Subscribed and sworn to before me this ....day of ...., A. D., 1919.

....

....

....

My commission expires

....

I certify that during the period for which flying pay is claimed on the attached voucher I was on duty requiring regular and frequent participations in aerial flights, and that during such period I participated in regular and frequent flights.

....

Date ....

NOTE.—In case the 50% increase for aviation is claimed, the above certificate should be accomplished and two copies of the special order from the Commanding Officer at the field where you were stationed placing you in a flying status returned herewith.

Developing Aviation in New Zealand

Extensive plans for enlarging the use and application of the airplane to public service, transportation and sporting fields of the Antipodes are in process of formation by the officials of the New Zealand Flying School, at Auckland. N. Z.

L. A. Walsh, the managing director of Walsh Bros. & Dexter, Ltd., aeronautical engineers and constructors, has directed a remarkable development of aviation in New Zealand, while training military aviators. In a recent letter to L. S. Scott, secretary of the Hall-Scott Motor Car Company of San Francisco and West Berkeley, Cal., he indicates the advance in aviation, and the opportunity before competent fliers, that exists in these antipodean quarters of the globe.

Several of their planes are equipped with Hall-Scott A-5a six-cylinder engines, and designs have been perfected by the engineers of the flying school for building several single and twin engined flying boats, as well as airplanes of the conventional overland type, which will be powered with the new Hall-Scott 1-6, 220 h. p. of the Liberty type, recently perfected.

Mail Carrying Planes

"The Minister to Post and Telegraphs in New Zealand," says Mr. Walsh, in his letter to the Hall-Scott Motor Car Company, "recently stated he intends to establish the carrying mails in aircraft throughout New Zealand. These plans were in process of formation prior to the cessation of hostilities, and now that the armistice has been signed, with a virtual impossibility of Germany reviving her military power, there is a special impetus given these plans, because of the return to New Zealand of a number of capable military fliers, who will be available for this public service.

"For this service we have in mind flying boats, and airplanes of the overland type, equipped with single engines of 125 and 200 h. p. respectively, and with twin engines of 250 and 400 h. p. We shall use these higher powered boats and planes for the longer runs.

As part of the program of post war aviation development outlined by the New Zealand Flying School, is a plan to construct a flying boat to make the trip from New Zealand to Australia. "Flying boats are eminently suitable," says Mr. Walsh, "for the coastal and inland waters of Australia and New Zealand, and as yet the former country has had no vivid demonstration of the value of the airplane and its possibilities in commercial and public service."

Col. Raynal C. Bolling

Government Support

The initiation of such a commercial service for the transportation of mails and passengers between the two countries is expected to receive substantial government support into both New Zealand and Australia, and the aggressive financial assistance of the many wealthy and enterprising commercial concerns in the two countries.

"Out of the five different types of airplane engines, used by the New Zealand Flying School," writes Mr. Walsh, "the Hall-Scott is eminently the best, and we believe that the combination of our machines and the Hall-Scott engines, applied to commercial aviation will lead to exceptionally satisfactory results in mail service, passenger service, sporting flights, and other general flying."

General Kenly in a Little Spill

An airplane carrying Major Gen. William L. Kenly, Chief of Military Aeronautics, on the way from Washington to Columbus to attend the Rickenbacker dinner, was forced down by a snow storm two miles northwest of New Philadelphia, O., Feb. 17. The machine struck on its nose and overturned.

Major V. C. Ocker, pilot, sustained a slight injury, but Major General Kenly was uninjured.

Major Smith Returns to San Diego

(*Continued from page* 1)

Bishop. When war was declared Major Smith was made one of the test officers for the acceptance of machines under the new aircraft program. While flying at Dayton, O., testing a Nieuport machine, his machine crashed and he suffered severe injuries, which prevented him from securing overseas service. He was sent to San Diego to take charge of the instruction work at Rockwell Field there.

Major Smith, 31, was born in Oklahoma, north of Enid. When the Flathead Indian reservation was opened, he hurried to North Dakota and took part in the drawing there, securing a piece of land and engaged in stock raising.

TRUE STORY OF COL. BOLLING'S DEATH TOLD

Misinformed of the Enemy's Position by British Officers

OFFICIAL INVESTIGATION

Fought Bravely Against Overwhelming Odds and Saved the Life of His Chauffeur

The first accurate account of how Col. Raynal C. Bolling of New York, former general counsel for the United States Steel Corporation, lost his life on the battlefield in France, has been made public by Clark D. Lenier, one of his closest friends.

Mr. Lenier first got copies of affidavits made by Private Paul L. Holder, military chauffeur to Col. Bolling, which were filed at the Paris War Office and confirmed by the War Department in Washington.

General Pershing had given the Colonel a fighting command in the air forces at the front and assigned him to a short period of observation duty with the Royal British Flying Corps that he might study the latest processes of combat and reconnaissance.

Misinformed by Officers

On the morning of March 16 last year Holder was driving Colonel Bolling in the direction of St. Quentin and the German lines. Twenty-six kilometres east of Amiens he was told by British officers that the enemy's front line was still three miles east.

He ordered his chauffeur to ascend a hill from which he desired to view the Somme battlefield, but before the summit was reached concealed German guns opened fire from both sides. Holder tried to race his engine to avoid stalling the car, but the machine guns punctured the radiator and the auto came to a sudden stop. The Colonel ordered Holder to jump into a shell hole. From here the chauffeur saw the officer load and reload his pistol, despite the fact he was under heavy gun fire. Suddenly a German officer appeared on the rim of the shell hole and fired at Holder, who was unarmed. Colonel Bolling shot and instantly killed the enemy. A second German officer appeared and fired twice at Colonel Bolling. The first shot went through his heart and he fell dead. Then the Germans ripped open the Colonel's travelling bag and rifled his pockets. Holder was made prisoner.

Official Investigation

The report of the British officers regarding the Colonel's death says the enemy advanced so quickly they were not aware he was so near.

For an American officer to be allowed to drive into an opening of this kind has been made the subject of official investigation.

Colonel Bolling was the first American officer of his rank to give his life in the war. The new aero grounds at Washington have been named "Bolling Field" in his honor.

Stopping the Use of Fake Insignia

It has been brought to the attention of the War Department that post exchanges and similar places are selling unauthorized insignia such as service ribbons and gold and silver stars to be worn on the uniform.

Responsible officers will take immediate steps to have such practice discontinued by post exchanges and stores under their immediate jurisdiction. At the same time every effort will be made to influence stores located near posts, camps or cantonments to discontinue the practice.

Honor Roll of the United States Air Service, A. E. F.

The following officers of the American flying arm have been decorated for conspicuous bravery in action. The list, which includes both American and foreign awards, has been carefully compiled from available official sources up to Feb. 5, but the records are not yet complete.

DISTINGUISHED SERVICE CROSS

Thomas J. Abernathy	2d Lieut.
Perry T. Aldrich	1st Lieut.
Arthur H. Alexander	1st Lieut.
Sterling C. Aleaxnder	1st Lieut.
Gardner Philip Allen	1st Lieut. C. A. C.
Flynn L. A. Andrew	1st Lieut.
Paul Armengaud	Major
Rodney M. Armstrong	1st Lieut.
Dogan H. Arthur	1st Lieut.
Benjamin L. Atwater	1st Lieut.
Walter L. Avery	1st Lieut.
Philip R. Babcock	Captain
David H. Backus	1st Lieut.
Wm. T. Badham	1st Lieut.
Paul Frank Baer	1st Lieut.
Ralph S. Bagby	1st Lieut.
Herbert B. Bartholf	1st Lieut.
Byrne V. Baucom	1st Lieut.
James D. Beane	1st Lieut.
David C. Beebe	2d Lieut.
Franklin B. Bellows	2d Lieut.
William Belzer	2d Lieut.
Otto E. Benell	2d Lieut.
Louis G. Bernheimer	1st Lieut.
Chas. Raymond Blake	1st Lieut.
Erwin R. Bleckley	2d Lieut.
Hugh D. Bloomfield	1st Lieut.
Allen F. Bonnalie	1st Lieut.
Horace L. Borden	2d Lieut.
Lloyd G. Bowers	1st Lieut.
Samuel C. Bowman	2d Lieut.
Theodore E. Boyd	1st Lieut.
Lewis H. Brereton	Lt. Colonel
Hugh Brewster	1st Lieut.
Arthur R. Brooks	1st Lieut.
Wm. E. Brotherton	2d Lieut.
Mitchell H. Brown	2d Lieut.
Harold H. Buckley	Captain
Edward Buford, Jr.	Captain
Valentine Burger	2d Lieut.
James S. D. Burns	2d Lieut.
Byron T. Burt, Jr.	1st Lieut.
Alan Butt	1st Lieut.
Douglas Campbell	Captain
George D. Carrol	1st Lieut.
John R. Castleman	1st Lieut.
Reed M. Chambers	Captain
Chas. W. Chapman	2d Lieut.
Kenneth S. Clapp	1st Lieut
Sheldon V. Clarke	1st Lieut.
Wallace A. Coleman	1st Lieut.
Harvey Conover	1st Lieut.
Everett R. Cook	Captain
Weir H. Cook	1st Lieut.
Hamilton Coolidge	Captain
John E. Cousins	Captain
Edward P. Curtis	1st Lieut.
Edward B. Cutter	1st Lieut.
Ralph E. de Castro	1st Lieut.
Willis A. Diekema	Captain
Raymond P. Dillon	1st Lieut.
Charles R. D'Olive	1st Lieut.
Kingman Douglass	1st Lieut.
Meredith L. Dowd	2d Lieut.
Chas. W. Drew	1st Lieut.
Arthur William Duckstein	1st Lieut.
Arthur C. Esterbrook	1st Lieut.
Warren Edwin Eaton	1st Lieut.
Robert P. Elliott	1st Lieut.
William P. Erwin	1st Lieut.
J. Dickinson Este	1st Lieut.
Leo C. Ferrenbach	1st Lieut.
Howard F. Fleeson	1st Lieut.
Justin P. Follette	1st Lieut.
Hugh L. Fontaine	1st Lieut.
Christopher W. Ford	Captain
Wm. F. Frank	1st Lieut.
John Frost	1st Lieut.
George Willard Furlow	1st Lieut.
Bradley J. Gaylord	1st Lieut.
Harold H. George	1st Lieut.
Ernest A. Giroux	1st Lieut.
Harold E. Goettler	2d Lieut.
George E. Goldthwaite	1st Lieut.
Alfred A. Grant	Captain
Fred C. Graveline	Sergeant
Charles G. Grey	Captain
Andrew F. Gundelach	1st Lieut.
Murray K. Guthrie	1st Lieut.
James Norman Hall	Captain
Lloyd A. Hamilton	1st Lieut.
Leonard C. Hammond	Captain
Percival G. Hart	2d Lieut.
Harold E. Hartney	Major
Benjamin P. Harwood	1st Lieut.
Frank K. Hays	2d Lieut.
James A. Healey	1st Lieut.
Phil A. Henderson	1st Lieut.
J. A. Higgs	1st Lieut.
Maury Hill	Captain
Raymond C. Hill	1st Lieut.
Roger W. Hitchcock	1st Lieut
Lansing C. Holden	1st Lieut.
Spesserd L. Holland	1st Lieut.
William J. Hoover	1st Lieut.
Donald Hudson	1st Lieut.
D. G. Hunter	1st Lieut.
Frank O'Driscoll Hunter	1st Lieut.
Livingston Gilson Irving	1st Lieut.
John N. Jeffers	1st Lieut.
Thomas M. Jervey	1st Lieut.
Arthur H. Jones	1st Lieut.
Clinton Jones	2d Lieut.
John W. Jordan	2d Lieut.
Clarence C. Kahle	1st Lieut.
Samuel Kaye, Jr.	1st Lieut.
Asher E. Kelty	1st Lieut.
Geo. C. Kennedy	1st Lieut.
Field E. Kindley	1st Lieut.
Clair A. Kinney	1st Lieut.
Wilbert E. Kinsley	2d Lieut.
James Knowles	1st Lieut.
John H. Lambert	1st Lieut.
German De Freest Larner	1st Lieut.
Walter R. Lasson	Captain
John B. Lee	2d Lieut.
Robert Lindsay	1st Lieut.
Frank A. Llewellyn	1st Lieut.
K. P. Littauer	Major
William O. Lowe	2d Lt. U. S. M. C.
Francis B. Lowry	2d Lieut.
Frank Luke, Jr.	1st Lieut.
Joel H. McClendon	1st Lieut.
Cleveland W. McDermott	2d Lieut.
James A. McDevitt	1st Lieut.
Harry O. McDougall	1st Lieut.
Elmore K. McKay	2d Lieut.
James R. McKay	1st Lieut.
Ora R. McMurry	1st Lieut.
John MacArthur	2d Lieut.
Winfred C. MacBrayne	1st Lieut.
James F. Manning, Jr.	1st Lieut.
Russell L. Maughan	1st Lieut.
James A. Meissner	Major
John F. Michenor	1st Lieut.
John Mitchell	Captain
William Mitchell	Brig. General
Edward Russell Moore	1st Lieut.
Edw. M. Morris	2d Lieut.
Oscar B. Myers	1st Lieut.
Roland H. Neel	2d Lieut.
Harlow P. Neibling	1st Lieut.
George R. Nixon	1st Lieut.
Sigbert A. G. Norris	2d Lieut.
Fred W. Norton	1st Lieut.
Stephen H. Noyes	1st Lieut.
Alan Nutt	1st Lieut.
Paul J. O'Donnell	2d Lieut.
Ralph A. O'Neill	1st Lieut.
Edward Orr	1st Lieut.
Richard C. M. Page	1st Lieut.
Joseph A. Palmer	2d Lieut.
William W. Palmer	1st Lieut.
Alfred B. Patterson, Jr.	1st Lieut.
Karl C. Payne	1st Lieut.
Elmer Pendell	1st Lieut.
Josiah Pegues	1st Lieut.
David McK. Peterson	Major
Glen Phelps	1st Lieut.
Geo. R. Phillips	1st Lieut.
Chas. W. Plummer	2d Lieut.
Lewis C. Plush	1st Lieut.
Britton Polley	1st Lieut.
William Thomas Ponder	1st Lieut.
Carl W. Porter	2d Lieut.
Charles P. Porter	2d Lieut.
Kenneth L. Porter	2d Lieut.
Glen A. Preston	2d Lieut.
Percy Rivington Pyne	1st Lieut.
John J. Quinn	1st Lieut.
Joseph C. Raible, Jr.	1st Lieut.
John I. Rancourt	1st Lieut.
Howard G. Path	1st Lieut.
Robert F. Raymond, Jr.	1st Lieut.
Clearton H. Reynolds	Captain
John N. Reynolds	Lt. Colonel
James M. Richardson	2d Lieut.
Edward V. Rickenbacker	Captain
Paul N. A. Rooney	1st Lieut.
Hermon C. Robison	1st Lieut.
Cleo J. Ross	1st Lieut.
Edward W. Rucker, Jr.	Captain
Leslie J. Rummell	1st Lieut.
Alexander P. Schenck	1st Lieut.
Karl J. Schoen	1st Lieut.
Arthur P. Seaver	1st Lieut.
Cecil G. Sellers	Captain
Sumner Sewall	1st Lieut.
Richard B. Shelby	1st Lieut.
Louis C. Simon, Jr.	2d Lieut.
John H. Snyder	1st Lieut.
Carl Spatz	Major
Richard Watson Steele	2d Lieut.
John H. Stevens	2d Lieut.
John Y. Stokes, Jr.	2d Lieut.
Penrose V. Stout	1st Lieut.
Wm. H. Stovall	1st Lieut.
Victor H. Strahm	Captain
W. J. R. Taylor	1st Lieut.
Walton B. Ten Eyck, Jr.	2d Lieut.
William Thaw	Lt. Colonel
Fred A. Tillman	2d Lieut.
Edgar G. Tobin	Captain
Wm. H. Vail	1st Lieut.
Remington D. Vernam	1st Lieut.
James E. Wallis	Captain
William W. Waring	1st Lieut.
Donald B. Warner	1st Lieut.
Pennington H. Way	2d Lieut.
Joseph F. Wehner	1st Lieut.
Wilbert W. White	1st Lieut.
Alan F. Winslow	2d Lieut.
Chester E. Wright	1st Lieut.

DISTINGUISHED SERVICE MEDAL

Charles T. Menoher	Maj. General
Mason M. Patrick	Maj. General

DISTINGUISHED SERVICE ORDER—BRITISH

A. F. Bonnalie	1st Lieut.

DISTINGUISHED FLYING CROSS—BRITISH

H. L. Bair	1st Lieut.
M. L. Campbell	1st Lieut.
Henry Robinson Clay, Jr.	1st Lieut.
John O. Donaldson	2d Lieut.
Floyd Andrews Hamilton	1st Lieut.
Charles L. Heater	1st Lieut.
Thomas John Herbert	1st Lieut.
P. T. Iaccaci	1st Lieut.
James Alfred Keating	1st Lieut.
Field E. Kindley	1st Lieut.
Reed G. Landis	Captain
Frederick E. Luff	1st Lieut.
Elliott W. Springs	Captain
George Augustus Vaughn	1st Lieut.

LEGION OF HONOR—FRENCH

(Commander)

Charles T. Menoher	Maj. General
William Mitchell	Brig. General

CROSS OF THE LEGION OF HONOR—FRENCH

Charles W. Miller	2d Lieut.
David E. Putnam	1st Lieut.

CROIX DE GUERRE—FRENCH

Thomas J. Abernathy	2d Lieut.
James H. Ackerman	1st Lieut.
Floyd H. Allport	2d Lieut.
Paul Frank Baer	1st Lieut.
Walter V. Barneby	1st Lieut.
James Henry Baucham	
James D. Beane	1st Lieut.
Charles John Biddle	Major
Stewart Bird	1st Lieut.
William O. Butler	Captain
Douglas Campbell	Captain
Richard Carside	1st Lieut.
Thomas G. Cassady	1st Lieut.
Chas. Wesley Chapman, Jr.	2d Lieut.
Arthur J. Coyle	Captain
Kenneth P. Culbert	2d Lieut.
Karl H. Eymann	2d Lieut.
Charles C. Fleet	1st Lieut.
Christopher Wm. Ford	Captain
Ernest A. Giroux	1st Lieut.
James A. Healy	1st Lieut.
Raymond C. Hill	1st Lieut.
Amos L. Hopkins	1st Lieut.
Sidney I. Howell	1st Lieut.
Frank O'Driscoll Hunter	1st Lieut.
Arthur H. Jones	1st Lieut.
Henry Jones	1st Lieut.
Henry P. Jones	Sergeant
Charles Maury Jones	Captain
Charles Wayne Kerwood	Sergeant
Charles Kinsolving	1st Lieut.
George Marion Kyle	1st Lieut.
G. DeFreest Larner	1st Lieut.
Manderson Lehr	1st Lieut.
Kenneth Marr	Major
James A. Meissner	Major
Charles T. Menoher	Maj. General
Charles I. Merrick	1st Lieut.
Paul Meyers	2d Lieut.
Robert Moore	1st Lieut.
Leo L. Murphy	1st Lieut.
Ralph A. O'Neill	1st Lieut.
Carter Landram Ovington	1st Lieut.
David McK. Peterson	Major
Granville Pollock	1st Lieut.
William Ponder	2d Lieut.
Charles P. Porter	2d Lieut.
Kenneth L. Porter	2d Lieut.
John A. Posey	2d Lieut.
Clifford R. Powell	1st Lieut.
David E. Putnam	1st Lieut.
Joseph C. Raible, Jr.	1st Lieut.
Rufus Randall Rand	Sergeant
Walter Davis Rheno	Corporal
Edward V. Rickenbacker	Captain
Ralph Royce	Lt. Colonel
Malcolm A. Sedgwick	2d Lieut.
Morteu Seymour	Lieut.
Harry Shaffer	2d Lieut.
Reginald Sinclaire	Sergeant
Louis C. Simon, Jr.	1st Lieut.
Donald Stone	Corporal
William Thaw	Lt. Colonel
George Evans Turnure	1st Lieut.
James E. Wallace	1st Lieut.
William E. Wass	1st Lieut.
Charles Herbert Wilcox	1st Lieut.
Alan Winslow	2d Lieut.
Joseph Volney Wilson	1st Lieut.
Houston Woodward	Corporal
James Norman Hall	Captain

FRENCH CITATIONS

Valentine J. Burger	Lieut.
Alexander T. Grier	2d Lieut.
Horace A. Lake	2d Lieut.

ITALIAN CROCE AL MERITO DI GUERRA

The following American Officers serving with the Italian Royal Air Force have been awarded the Italian War Cross:

MAJOR

Fiorello H. La Guardia

FIRST LIEUTENANTS

James L. Bahl (deceased)
Raymond P. Baldwin
Arthur M. Beach
Allen W. Bevin
Gilbert P. Bogert
Arthur F. Clement
William C. Cochran
De Witt Coleman, Jr. (deceased)
Kenneth G. Collins
Alexander M. Craig
Herbert C. Dobbs, Jr.
Edmund A. Donnan
Norton Downs, Jr.
Arthur D. Farquhar
Harry S. Finkenstaedt
Willis Fitch
Donald G. Frost
William O. Frost
Gosta N. Johnson
James P. Hanley, Jr.
George C. Hering
Wallace Hoggson
LeRoy D. Kiley
Herman F. Kreuger
Paton MacGilvary
Oble Mitchell
William H. Potthoff
Aubrey G. Russell
William Shelton
Norman Sweetser
Emory E. Watchorn
Frederick K. Weyerhaeuser
Warren Wheeler
Alfred S. R. Wilson
Warren S. Wilson

2ND LIEUTENANTS

Spencer L. Hart
James Kenedy
Norman Terry

ITALIAN CITATIONS

The following American Officers, First Lieutenants, attached to the Italian Air Service, have been mentioned in citations:

James P. Hanley, Jr.
George C. Hering
William B. Shelton
Norman Sweetser
Emory E. Watchorn
Frederick K. Weyerhaeuser

AIR SERVICE CITATIONS

Three hundred and seventy-four awards and citations have been issued to members of the American Air Service to date.

The Director of Military Aeronautics has just received a second list of honors and awards confered upon American Aero Squadrons and flying officers of the American Expeditionary Forces. This list gives the citations of five squadrons, including the Lafayette, the 17th and 148th, which were with the British; the 90th and the 99th Squadrons. The names of fifty-nine American flying officers awarded the Distinguished Service Cross are recorded. Thirteen awards of the Croix de Guerre and three French citations are listed. One award of the British Distinguished Flying Cross is announced. The list of Italian honors conferred shows that thirty-nine American officers won the Croce al Merito di Guerra; six others were mentioned in Italian citations.

Distinguished Service Medals have been awarded to Generals Menoher and Patrick and Legion of Honor Medals, Commander, to Generals Menoher and Mitchell.

The list, together with the first list, which showed the citations of five American Squadrons, the 1st Day Bombardment and 129 Air Service officers, brings the number of Air Service citations up to 250 individuals and eleven organizations, not including over 100 other awards of Distinguished Service Croses announced by the War Department.

The citation of the Lafayette Squadron, formerly the Lafayette Escadrille, is signed by General Petain and reads as follows: "Brilliant unit which has shown itself, during the course of operations in Flanders, worthy of its glorious past. In spite of losses which took away a third of its effectives, in a difficult sector, it has assured a perfect security to our Corps Observation airplanes, a complete service of reconnaissance at both high and low altitudes, and the destruction, not only near the front lines, but deep in the enemy's territory, of a great number of German airplanes and captive balloons."

The 17th and 148th Squadrons which served with the British Royal Air Force were cited in letters by both Generals J. M. Salmond and J. Byng, when they were transferred to the American Army. In citing the 90th Squadron, General Bell, commanding the 33d Division, says in part: "I wish to express to you at this time my appreciation for the valuable and efficient work your squadron has done while serving with us. You have met all our requests with willing compliance unless prevented unquestionably by the elements. Your greatest cooperation has been in assisting us in locating our lines, which you have done repeatedly with uniform success and accuracy."

Attached to the citation is a list of the pilots of this squadron, as is the case of this citation of the 99th Aero Squadron, by Major General J. E. McMahon, in which he especially mentions pilots and ballonists as follows:

Capt. WILLIAM O. BUTLER, Germantown, Pa.

Lieut. JAMES A. HEALY, Jersey City, N. J.

Lieut. THOMAS J. ABERNATHY, West Pembroke, Me.

Lieut. SIDNEY I. HOWELL, E. Orange, N. J.

Lieut. ARTHUR H. JONES, Hayward, Calif.

Lieut. LEE M. MURPHY, Roxbury, Mass.

Lieut. RALPH A. O'NEILL, Nogales, Ariz.

Lieut. CHARLES P. PORTER, Beechmont, New Rochelle, N. Y.

Lieut. KENNETH L. PORTER, Dowagiac, Mich.

Lieut. JOSEPH C. RAIBLE, JR., Hannibal, Mo.

Lieut. LOUIS C. SIMON, JR., Columbus, Ohio.

Lieut. JAMES E. WALLACE (examined), Atlanta, Ga.

Major General George O. Squier says:
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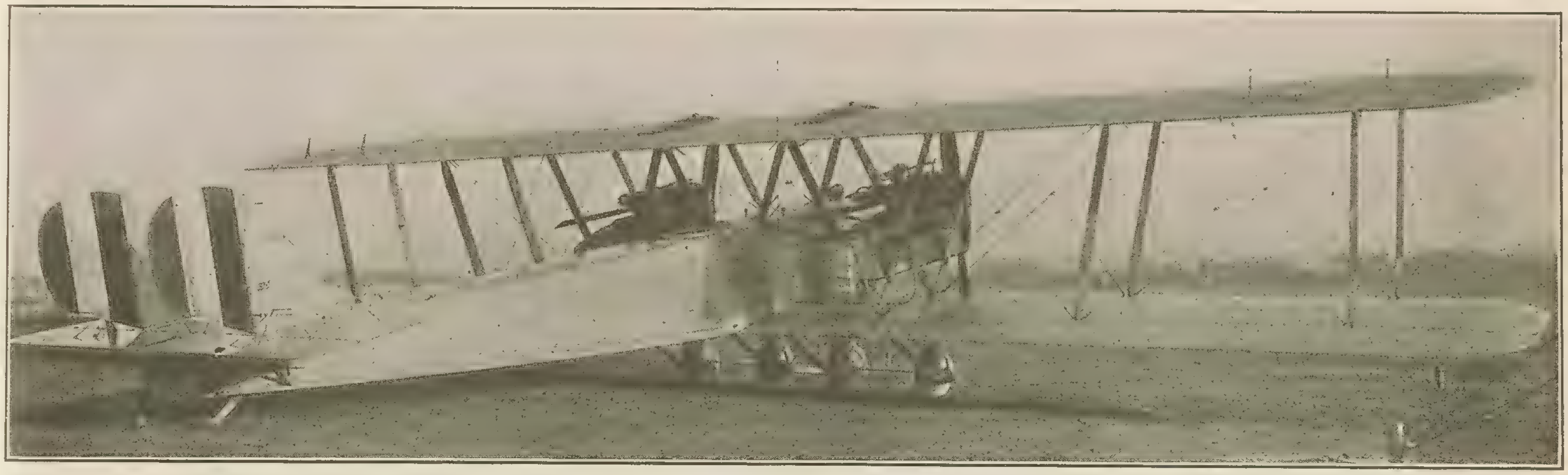

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Government Exhibit at the Aircraft Show

(*Continued from page* 1)

be on hand to demonstrate all things connected with this branch of the work.

The War Department will also have charge of one section of the wireless telephone to be installed, and which all visitors may use to test the efficacy of the invention.

Motion pictures, composed of reels released for the first time by the Government, will be shown during the lecture hours each day. The photographic branch of the Air Service will have a booth of aerial pictures and equipment, with men to explain the use of the most modern devices used in this war work.

Some of the Exhibitors

Besides the United States Army and Navy, among the exhibitors of planes, dirigibles and engines will be: Dayton Wright Airplane Co., Curtiss Aeroplane & Motor Corp., L. W. F. Engineering Co., Wright-Martin Aircraft Corp., Aeromarine Plane & Motor Co., Thomas-Morse Aircraft Corp., Burgess Co., Galdaudet Aircraft Corp., B. F. Sturtevant Co., Packard Motor Co., Lawrence Aero Engine Corp., Gio. Ansaldo & Co., Goodyear Tire & Rubber Co., L. Sperry Aircraft Co., Glenn Martin Co., Boeing Airplane Co. and Cantilever Aero Co.

Among the accessories exhibitors will be: Empire Art Metal Co., Arthur Johnson Mfg. Co., Dodge Mfg. Co., Valentine & Co., Zenith Carburetor Co., Wellington, Sears & Co., John A. Roebling's Sons Co., Eastman Kodak Co., Motor Compressor Co., Cold Light Mfg. Co., Livingston Radiator Co., American Balsa Co., Jones-Metrola Co., Champion Ignition Co., Dayton Engineering Laboratories Co., Ajax Auto & Aero Sheet Metal Co., Stone Propeller Co., Aerial Age, Splitdorf Electrical Co., National Cash Register Co., Jamestown Propeller Co., American Propeller Co., Hartzell Walnut Propeller Co., Dayton Wire Wheel Co., Lunkenheimer Co., General Ordnance Co., Society of Automobile Engineers, Gardner-Moffat Co., Ind., Torrington Co., Simms Magneto Co., Triplex Safety Glass Corp., Radium Dial Co., American Bosch Magneto Co., Sterling Engine Co. and Detroit Accessories Corp.

Association Membership

The membership of the Manufacturers' Aircraft Association, with the name of the representative of each, is as follows: I. M. Uppercu, Aeromarine Plane & Motor Corp., 1881 Broadway, New York City; Greely S. Curtis, Burgess Company, Marblehead, Mass.; W. W. Moss, Curtiss Aeroplane & Motor Corp., Buffalo, N. Y.; Harold E. Talbot, Jr., Dayton Wright Airplane Company, Dayton, Ohio; Fred Fisher, Fischer Body Corporation, Detroit, Mich.; Albert H. Flint, L-W-F- Engineering Company, College Point, L. I.; Harry B. Mingle, Standard Aircraft Corp., Elizabeth, N. J.; Benj. S. Foss, Sturtevant Aeroplane Company, Jamaica Plain, Boston, Mass.; J. G. White, Springfield Aircraft Corp., Springfield, Mass.; A. J. Siegel, St. Louis Aircraft Corporation, St. Louis, Mo.; F. L. Moss, Thomas-Morse Aircraft Corp., Ithaca, N. Y.; George S. Patterson, The Engel Aircraft Corp., Niles, Ohio; George H. Houston, Wright-Martin Aircraft Corp., New Brunswick, N. J., and Glenn L. Martin, Glenn L. Martin Co., Cleveland, O.

Management of the Exposition

The Exposition will be under the management of a committee consisting of: I. M. Uppercu, chairman; A. H. Flint, Fay L. Faurote, B. A. Guy and S. S. Bradley.

Distributes 20% Bonus on Salaries

Many progressive business organizations have adopted one or another form of profit-sharing plan for employees. Few, however, have shown so great liberality in this respect as the H. W. Johns-Manville Co., miners and manufacturers of asbestos, and allied products, who will distribute to all salaried employees—men and women—from heads of branches and departments to office boys, who have been in continuous service for the full calendar year nineteen eighteen, an extra compensation of 20 per cent on the salaries paid them during 1918.

During the past two years especially, the members of this organization, in common with many others, have been working under an exceptional strain, owing to the depletion of their ranks through enlistment and the high pressure of war production.

In appreciation of this fact, the H. W. Johns-Manville Co. has at the end of each war-year, 1917 and 1918, set the mark even higher than before—a full 20 per cent of the year's salary.

This extra compensation for 1918 will cost the company approximately $1,000,000.

Cross Country Flights in Georgia

Cross country flights were made recently from Souther Field to Monroe, Ga. Three Curtiss airplanes were used by Lieut-Col. Frederick T. Dickman, Commanding Officer at Souther Field, with Lieut. A. W. Vance; Lieut. E. A. Burgtorf with Lieut. D. M. Suttle and Lieut. W. F. Sutter with Sergeant Dale W. Smith. Headwinds and clouds were encountered on the outward trip and a southwest gale on the return, necessitating holding the ships to the westward in order to maintain a southwesterly course. The entire distance of one hundred seventy miles was travelled in about two hundred minutes, the heavy winds preventing fast time. The entire journey homeward was made at the elevation where freezing temperature prevailed

Petrol Tanks Which Won't Catch Fire

A new petrol tank, which will neither leak nor catch fire when perforated by incendiary bullets, the London Daily Mail says, has been added to the list of wonderful war inventions.

These tanks were being built and fitted in British airplanes as fast as possible when the armistice was signed. Had the fighting continued, British pilots would have been immune from one of the greatest causes of casualties.

This invention is to be applied to commercial airplanes.

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As only a very limited number of copies of the original report were printed and no more can be obtained in this country, the Manufacturers Aircraft Association, Inc., has reprinted the complete report (83 pages of text) in attractive pamphlet form, size 13 x 8⅜.

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Personals

Howard E. Coffin, vice-president of the Hudson Motor Car Co., is traveling in Europe studying the latest developments in aviation and motor engineering. Mr. Coffin's interest in aviation dates back to the early days when, as a highly successful automobile engineer, he gave considerable of his time to the flying art.

Capt. William J. Dean, A. S., A., is ordered to report to the commanding officer, port of embarkation, Hoboken, N. J., for duty as Acting Assistant Judge Advocate, maritime affairs, New York City. Captain Dean was attached to headquarters of the Division of Military Aeronautics.

Major Robert L. Walsh, N. A., is announced as a junior military aviator, as of July 3, 1918.

Lieut.-Col. Roy C. Kirkland, A. S., A., has been assigned to the command of the Aviation General Supply Depot, Middletown, Pa. Lieutenant-Colonel Kirkland was formerly attached to the Air Service Depot at Garden City, N. Y., and had recently been in Washington, D. C., on a leave of absence.

Announcement is made of the appointment of Major Thomas G. Lanphier, Infantry, as a junior military aviator to date from Dec. 10, 1918.

Major John M. Satterfield, A. S., A., is ordered to proceed from the port of embarkation, Hoboken, N. J., and report in person to the Director of Military Aeronautics for duty.

First Lieut. George S. Flanders, A. S., is appointed as Acting Quartermaster at Kentucky-Wesleyan University, Winchester, Ky.

Capt. John A. Hambleton, A. S., A., is ordered to report in person to the Director of Military Aeronautics for discharge from the service.

Lieut.-Col. Alfred H. Hobley, A. S., A., is announced as a junior military aviator to date from Jan. 6, 1919.

Major Thacker V. Walker, A. S., A., was assigned on Jan. 22, to Supply Section.

Major Benjamin G. Weir, J. M., A. S., A., was assigned on Jan. 21 to Supply Section.

Major Frederick T. Blakeman, A. S., A., who reported Feb. 6, to the Director of Military Aeronautics, from London, was assigned to the Training Section.

Lieut.-Col. Lewis H. Brereton, A. S., A., who reported to the Director of Military Aeronautics, from overseas on Feb. 6, has been assigned to duty in the Training Section and granted leave for ten days.

Col. Joseph C. Morrow, Jr., M. A. and Col. Walter G. Kilner, J. M. A., have reported at the D. M. A. from overseas.

Major Thorne Deuel is ordered from the Air Service Depot, Garden City, N. Y., to Carlstrom Field, for duty.

Lieut.-Col. Lewis E. Goodier, Jr., is ordered from the Air Service Depot, Garden City, N. Y., to San Francisco, for duty as Air Service Officer in the Western Department.

Lieut.-Col. Richard B. Barnitz, A. S. A., is chairman of a board of officers appointed to meet at Post Field to examine officers as to their qualifications for rating as junior military aviators.

Major John E. Rossell is ordered from the First Reserve Wing to March Field, for duty.

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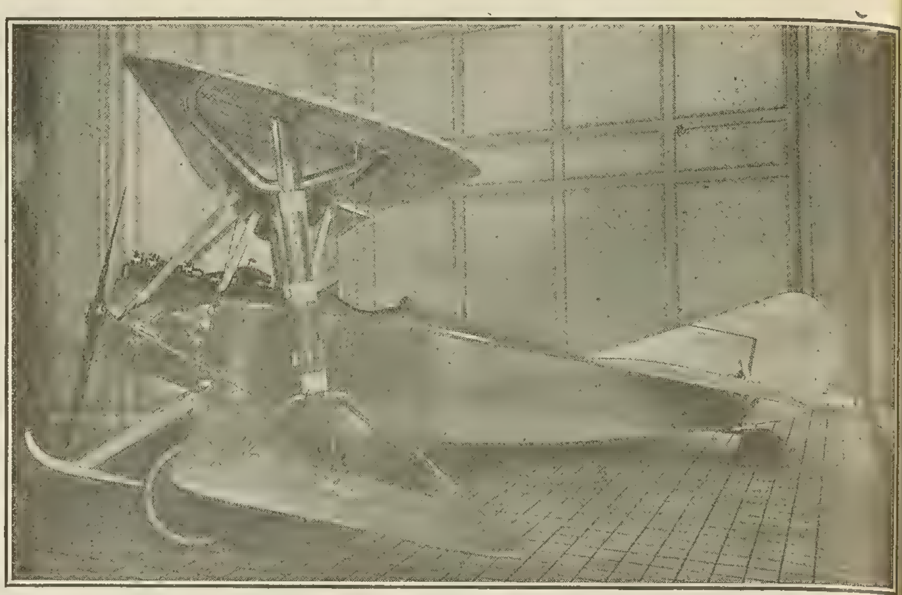

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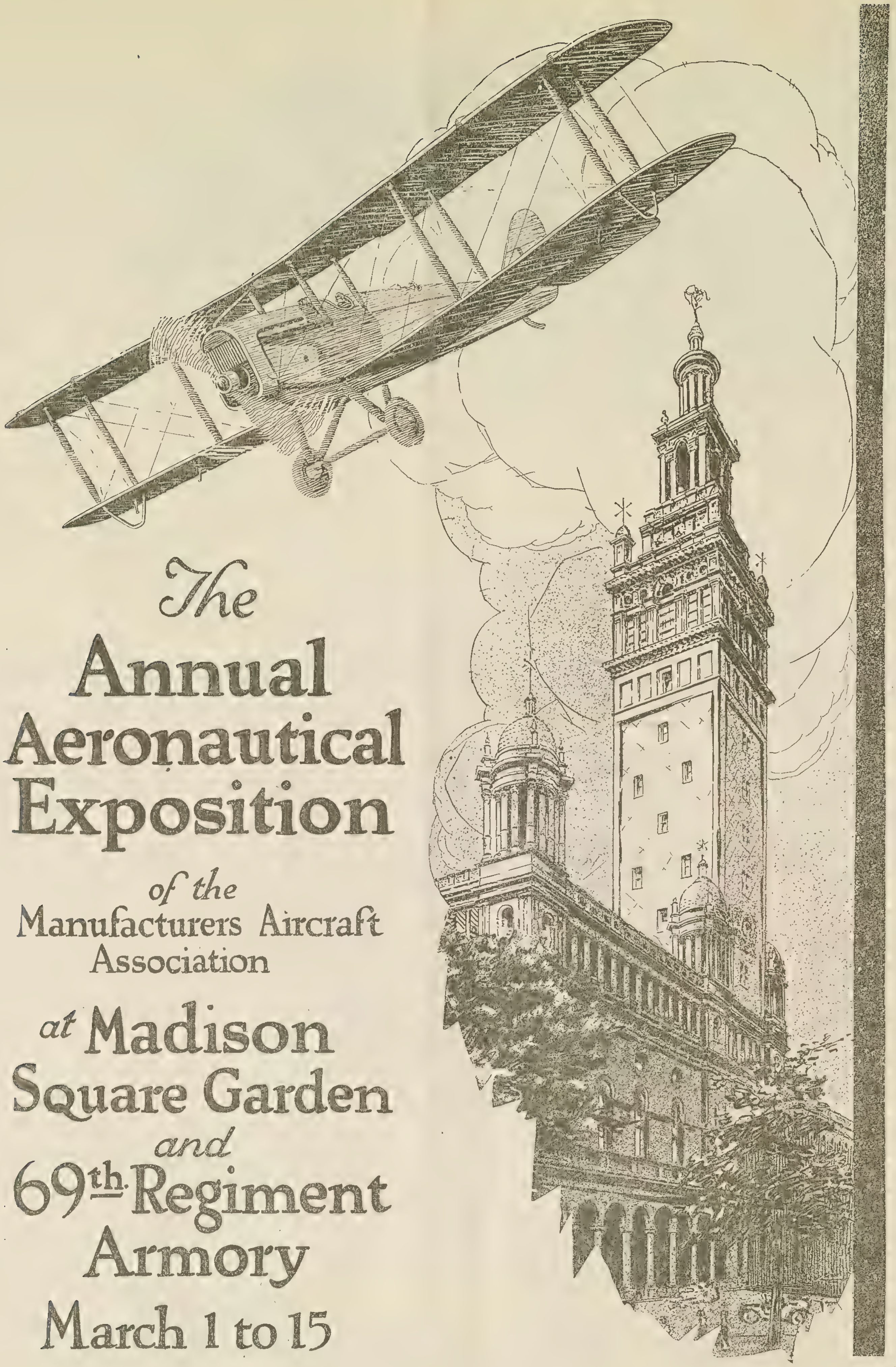

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EXPOSITION EDITION—NUMBER ONE

AIR SERVICE JOURNAL

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HOW TO JUDGE AN AIRPLANE

By Alexander Klemin

Consulting Aeronautical Engineer

In this article, written for the AIR SERVICE JOURNAL *by Mr. Klemin, Technical Editor of Aviation, the visitor to the Aeronautical Exposition will find told comprehensively, in non-technical terms, all that is required to understand the construction of an airplane. The main elements of the plane are described so clearly that a schoolboy can understand them. To see the show intelligently, therefore, a careful reading of Mr. Klemin's article will be of great assistance to many persons who enter Madison Square Garden between March 1 and March 15:*

The present aero show constitutes a wonderful object lesson in airplane construction. Every type of land machine, small or large, every type of seagoing plane is represented. It offers unrivalled opportunities to the designer, constructor and pilot. At the same time, it is a splendid opportunity for the man who takes a popular interest in the subject of aeronautics.

It is from the point of view of this popular interest that the present article has been written.

We shall take up step by step the cardinal points of airplane construction, and see wherein excellence lies, what particular points there are to observe, what to praise and what to criticize. The article is easy to read, but it will present more difficulties than a popular story.

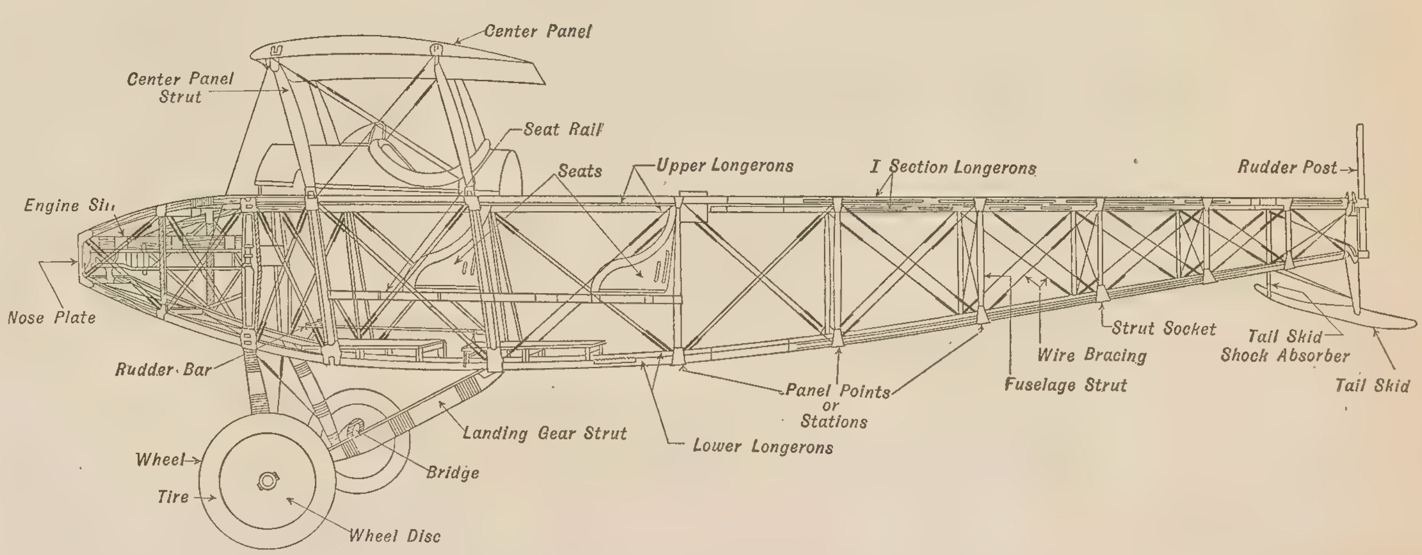

Fig. 12.—Details of Fuselage Construction.

Fundamental Principles of the Airplane

In the airship the sustentation of the envelope depends on the fact that the hydrogen it contains is lighter than the surrounding air, and consequently tends to rise, carrying with it the car, the passengers and other loads. This is the fundamental principle of lighter-than-air craft.

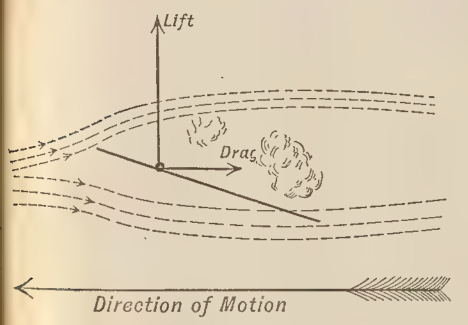

Fig. 1.—The Fundamental Principle of the Airplane; the Flat Surface Is Moving Through the Air and Experiences Two Forces, Lift or Sustentation and Drag or Resistance.

The airplane is a heavier-than-air craft and depends on quite another principle for its sustentation. *If a man move his hand in an inclined position rapidly in the water of a bath tub, he will feel the water tending to lift his hand up, and at the same time, it will oppose his progress.* In a similar way if, as in Fig. 1, a flat surface is moving through the air it will experience two forces, one vertically upwards which will be the lift or sustentation, the other along the line of motion, which tends to retard the motion, resistance or drag. The bigger the area the greater will be the lift, and the more rapid the speed. The fundamental problem of an airplane is to provide a large surface, not necessarily flat, but fashioned in a skilful manner so as to be efficient, and to pull this surface along rapidly so as to provide the necessary lift or sustentation. But while the surface or wing is providing life or sustentation it is also experiencing resistance or drag, which has to be overcome. To overcome this drag we must have energy which comes from the fuel consumed in the engine, and acts through the propeller which is like a giant corkscrew churning its way through the air.

The main elements of the airplane are then, the wings which sustain the craft, the propeller which pulls these wings through the air, and the engine which provides the energy to turn the propeller.

The Main Elements of an Airplane

But these are far from being all the elements of an airplane. In Fig. 2 these main elements are illustrated in a diagram of a typical tractor biplane. It is termed thus because it has two wings for its supporting surfaces, and the propeller pulls and is therefore a tractor.

The supporting surfaces are termed "Upper and Lower Wing" respectively.

The length of the wings across is termed the 'Span." The width of the wings is termed the "Chord." (It should be noted that the span and chord for the upper and lower wings may be different).

(*Continued on Page* 8)

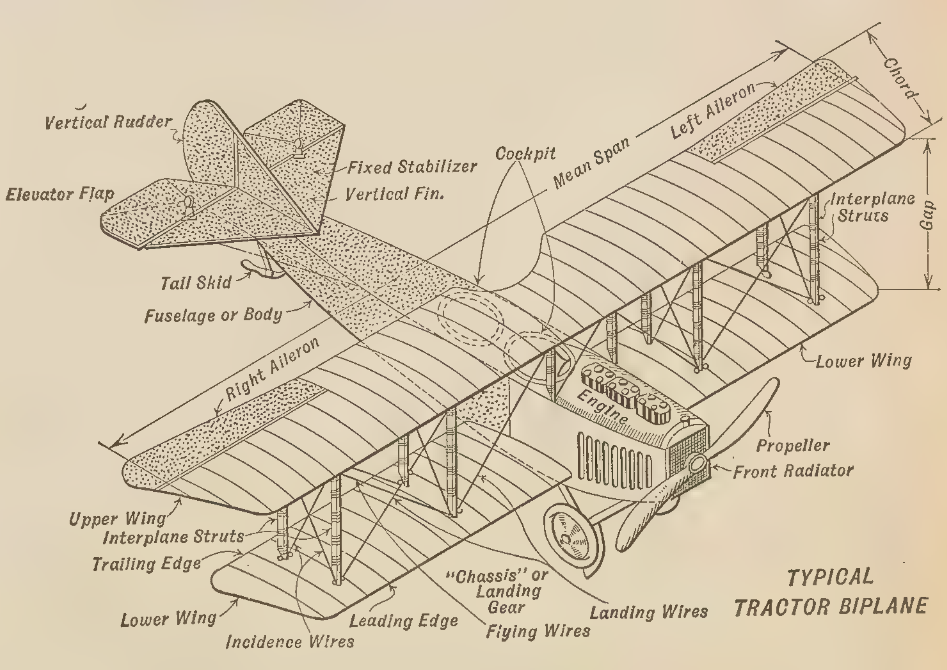

Fig. 2.—The Main Elements of an Airplane.

The
Annual Aeronautical Exposition
of the
Manufacturers Aircraft Association
at Madison Square Garden
and
69th Regiment Armory
March 1 to 15

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The Aeronautical Exhibition

The Aeronautical Exhibition will give the public its first comprehensive view of the various types of aircraft, equipment and aerial armament which the industry has developed with the cooperation of the Air Services of our military and naval establishments, and which have played such an important role in our victory over Germany. In spite of the fact that comparatively few American built airplanes were in service at the front when the armistice was signed, the great potentiality of our constantly increasing aircraft production had no small share in making the enemy realize what the future would hold for him in aerial warfare.

To accomplish the results which the public is now enabled to view at the Aeronautical Exposition has required the full-hearted cooperation of thousands of firms whose names will never be associated with the aeronautic war program. These makers of parts and accessories will have a justified feeling of pride in the share they contributed toward making this program a success when they see the enthusiasm the public cannot help but show at the sight of the splendid aeronautic material exhibited.

Those of the visitors who are familiar with the highly specialized types of airplanes required for military and naval combat work, and are aware of the number of such machines which are missing from the show, may find an object lesson in respect to what is needed for completely Americanizing the equipment of our Air Service. That this can be taken care of by our constructors and engineers provided the official encouragement is not lacking is quite apparent, and the exposition, by its timely nature, will render great service in acquainting the public with this fact.

Honor to Whom Honor Is Due

In the last issue of Air Service Journal there was printed an Honor Roll of the United States Air Service, A. E. F., obtained from official sources in Washington. It was inevitable that there should have been omissions, and attention has been called to the fact that the list did not contain the names of 2nd Lieut. Harold W. Andrews, son of W. F. Andrews of North Girard, Pa., and Capt. John L. Glover, son of Mrs. Henry Sheaff Glover of Fairfield, Conn.

Lieut. Andrews was with the French Air Forces from April to August, 1918. On July 31, 1918, he was decorated with the *Croix de Guerre* by Commandant Vuillemin, *Service d'Aviation.*

Capt. Glover received his training in France and was one of the first pilots to go "over the line." He, too, won the *Croix de Guerre.*

Another name omitted was that of 1st Lieut. Allen E. Peck, son of Hubert E. Peck of Washington, D. C., who was awarded the *Croix de Guerre.*

Very likely some time will elapse before a complete and accurate list of our air heroes in France can be printed. Meantime the Air Service Journal will be glad to correct any errors or omissions made in the roster published Feb. 22.

Future of Aviation

"It is most difficult to foretell all of the future of aviation. No doubt many uses will develop which are now entirely unforeseen. The most immediate and practical uses will be for national defense, for sport, for transportation of mail and light merchandise and for passenger service supplementing special trains.

"A commercial demand will be quickly created when safe landing places for the present high speed machines are provided at frequent intervals, or when a type of machine is developed which can safely land on any ordinary ground.

"I believe that the failure of the airplane for sport and commercial uses up to this time has been entirely due to the lack of facilities for safe landing at any and all times.

"Many of the present military machines can be utilized in mail service between cities where the interlying territory provides frequent landing places.

"I believe the peace-time uses of the airplane will be in proportion to the safety provided."—*Orville Wright.*

Importance of Standardization

"All things being equal, the flier must be given the preference over the non-flier, and again that, all things being equal, the man who has had service in contact with the enemy must be given preference over one who has not had such service.

"I look to see in the near future, in a matter of months only, perhaps, the command of the line of battle exercised from the air instead of from some dugout out of sight and more or less out of touch with the situation.

"As in the case of any commercial activity, there should be constant endeavor toward standardization. To adequately accomplish this there should be:

"A.—A national aircraft engineering standards commission working in conjunction with our Bureau of Standards, which commission should be in touch with a similar international standards commission.

"B.—A national aerial digest and bureau charged with the collection and publication of data which marks new advances in the development and use of aircraft and aircraft material, and the results of physical and medical research pertaining thereto.

"C.—The publication of a revised, up-to-date aeronautical dictionary.—*Major General Charles T. Menoher.*

Spruce Production

Gen. Brice P. Disque is an interested witness, no doubt, but his account of what was done in aircraft production in America is a proper and necessary offset to the partisan criticism of our air work.

Gen. Disque shows that for seven months all spruce was shipped to Allied factories, since these, better established than ours and in closer touch with needs of the front, could make better use of the material. He tells us that the 10,000 Allied planes on the western front at the signing of the armistice were put there, in large measure, through American effort, and were built mainly of American materials. He declares that we had 1,700 planes of our own manufacture in Europe when the war ended, and 350 of our planes were lost, and that they accounted for 1,000 German planes.

This branch of the national effort was not by any means the utter failure which some partisan critics have tried to make it appear.—*Chicago Journal.*

Remarkable Array of Exhibits

During the Aeronautical Exposition at Madison Square Garden the Air Service Journal will publish three special numbers, including the present issue; one on March 8 and the third on March 15.

So vast is the number and so diversified is the character of the exhibits that anything like an adequate description of them in a single edition is out of the question. Therefore readers of the Air Service Journal will find the two next following issues of exceptional interest.

Correct List of Exhibitors at the Aeronautical Exposition

Government Exhibits

U. S. NAVY

Bureau of Construction and Repair:

Aeromarine Boat.
Looning kitten.
F-5-L and NC-1 with handling truck.
HS-1 with handling truck.
H-A Fighter with handling truck.
N-9 with handling truck.
Kite Balloon fully equipped—from roof.
Kite Balloon winches (two types).
Parachutes.
Model of Rigid-30″ Towing model.
An exhibit from the Naval Aircraft Factory of wing and pontoon sections.

Instruments:

Accelerometer
Air Speed Meters
Ballonet Gauge
Bilge Pumps
Communication Helmets
Fire Extinguishers
Hydrogen Leak Detectors
Incidence Indicators
Inclinometers
Instrument Board
K. B. Board Box
Manometers
Oxygen Resp. and Breather
Pigeon Carrier
Safety Belts
Servo Motors
Tension Meter
Turn Indicator

Original Machine Flown by Wilbur and Orville Wright at Kitty Hawk, N. C., Dec. 17, 1903

Bureau of Steam Engineering:

Various types of engines—approximately ten in number—only navy types
Various types of propellers
Various types of radiators
Radiator Shutters
Oil and water heaters for use in cold water
Bijur self starter for Liberty engines
Vacuum fuel system to be used with Liberty engines
Delano combining electric and hand starter for Liberty engines
Phillips-Brinton ignition system
Variable pitch propellers
Radio equipment
Electrical equipment
Telephone wireless
Aldis Lamp
Intercommunicating sets
Running Lights (Airship type)
Electric Heated Clothing
Recognition Lights
Compass Receiver

Bureau of Ordnance:

Aerial Bombs of various types
Lewis Machine Guns
Various types of Wind Vane and Ring Sights
Camera Gun
Davis Gun and Ammunition for same
Very's pistols and ammunition

Bureau of Navigation:

Taylor Altimeter 20,000
Tagiabue Altimeter 25,000
Keyless Clock
Waltham Clock
Electric Clock
Navy Standard I Compass
Mark II Compass
Mark III Compass
Barograph
Pocket Recording Barograph
Pocket Aneroid
Atlas Chart Board
Course and Distance Finder
Bearing Plate
Navigation Note Book
Deviation Cards
Statoscope
Navy Hand Hold Camera Model K
Navy Hand Hold Camera Model B
Goggles

Bureau of Supplies and Accounts:

Life Jackets

Other Features of Interest:

Some pigeons have been returned from Pauillac, which have made wonderful records of achievement. They have averaged the delivery of four messages a day from planes in distress, and have been the means of saving many lives.

Photographs:

Photographic display fixtures might be utilized to a good advantage. They might show what construction work has been done at the various stations, personnel of the stations, the various types of planes used, crashes, etc. Photographs might cover the walls of the booths showing methods of training, following a student from Ground School to Elementary School and gunnery, bombing and navigation work at the Advanced School. Photographs illustrating the construction of the Flying Boats in the various stages. Methods of inflating and operating Dirigibles and Kite Balloons. Photographs showing various cities near our Air Stations, taken from the air. Men descending from planes and dirigibles by parachutes.

Moving Pictures:

Moving pictures on screen twenty feet away, showing the results of various experiments, such as bomb dropping, gunnery, stabilizing devices, etc.

Radio Telephone:

This is installed and placed in actual operation.

U. S. ARMY AIR SERVICE

Planes:

DeHaviland 4
DeHaviland 9
Handley Page
Caproni
Glenn Martin SE. 5
V. E. 7
Loening mono.
Standard J. 1
J. N. 4 D
J. N. 4 H
J. J. 6 H
Penguin
Lepere
Thos. Morse
Hospital Plane
Breguet
Nieuport
Pomilio
Spad
Fokker
Albatros
Taube
S. V. A.
Albree

Engines:

Liberty 8
Liberty 12
O. X. 5
Hispano Suiza 180
Hispano Suiza 300
Bugatti
Gnome
LeRhone
Hall Scott
Lawrance

Balloons:

Caquot
French Barrage
Winch
Trailer
Propaganda outfit
Pierce gun
Parachute
Free Bag

Miscellaneous:

Photo hut, cameras, etc.
Voice control demonstration
Motion Picture show
Lantern slide lecture
Photo display
Bombing demonstration
Rocking Nacello, guns, etc.
Contest — assembly of planes by mechanics
Canvas portable hangar
Portable machine shop
Pigeon display
Instruments
Medical stunts
Airplane trailer
Miniature range artillery

The Caproni triplane and the Navy F-5 L are located in the 69th Regiment Armory, Lexington and 26th Street, while the Cacquot balloon is to be seen from the roof.

Commercial Exhibitors

NAMES	ADDRESSES
Empire Art Metal Co	College Point, L. I.
Arthur Johnson Mfg. Co	14 Church St., N. Y. C.
Dodge Mfg. Co	Mishawaka, Ind.
Valentine & Company	456 Fourth Ave., N. Y. C.
Zenith Carbureter Co	Detroit, Mich.
Wellington, Sears & Co	66 Worth St., N. Y. C.
John A. Roebling's Sons Co	Trenton, N. J.
Eastman Kodak Co	Rochester, N. Y.
Motor Compressor Co	52 Dickerson St., Newark, N. J.
Cold Light Mfg. Co	50 Union Square, N. Y. C.
Livingston Radiator Corp	75th St. & Amsterdam Ave., N.Y.C.
American Balsa Co	50 E. 42nd St., N. Y. C.
Jones Motrola Co	29 W. 35th St., N. Y. C.
Champion Ignition Co	Flint, Mich.
Dayton Eng. Lab. Co	Dayton, Ohio
Ajax Auto & Sheet Metal Co	245 W. 55th St., N. Y. C.
Stone Propeller Co	Dayton, Ohio
Aerial Age	40th St. & Madison Ave., N. Y. C.
Splitdorf Electrical Co	98 Warren St., N. Y. C.
National Cash Register Co	Dayton, Ohio
Jamestown Propeller Co	Jamestown, N. Y.
American Propeller & Mfg. Co	243 E. Hamburg St., Balto., Md.
Hartzell Walnut Propeller Co	Piqua, Ohio
Dayton Wire Wheel Co	Dayton, Ohio
Lunkenheimer Co	Cincinnati, Ohio
General Ordnance Co	Groton, Conn.
Society of Automobile Engineers	29 W. 39th St., N. Y. C.
Gardner Moffat Co., Inc	22 East 17th St., N. Y. C.
Torrington Co	Torrington, Conn.
Simms Magneto Co	East Orange, N. J.
Triplex Safety Glass Corp	Mount Vernon, N. Y.
Radium Dial Co	Pittsburgh, Pa.
American Bosh Magneto Co	223 W. 46th St., N. Y. C.
Detroit Accessories Corp	Detroit, Mich.
Sterling Engine Co	1252 Niagara St., Buffalo, N. Y.
Perry Austen Mfg. Co	Grasmere, S. I.
Dayton-Wright Airplane Co	Dayton, Ohio
Curtiss Aeroplane & Motor Corp	Buffalo, N. Y.
L. W. F. Engineering Corp	College Point, L. I.
Wright-Martin Aircraft Corp	New Brunswick, N. J.
Aeromarine Plane & Motor Co	Times Bldg., N. Y. C.
Thomas Morse Aircraft Corp	Ithaca, N. Y.
Burgess Co	Marblehead, Mass.
Gallaudet Aircraft Corp	East Greenwich, R. I.
B. F. Sturtevant Co	Hyde Park, Boston, Mass.
Packard Motor Car Co	Detroit, Mich.
Lawrence Aero Engine Corp	644 4th Ave., N. Y. C.
Gio Ansaldo & Co	80 Maiden Lane, N. Y. C.
Goodyear Tire & Rubber Co	Akron, Ohio
Cantilever Aero Co	1265 Broadway, N. Y. C.
L. Sperry Aircraft Co	Farmingdale, L. I.
Boeing Aeroplane Co	1100 Hodge Bldg., Seattle, Wash.
Glenn Martin Co	Cleveland, Ohio
Stewart Hartshorn Co	250 Fifth Ave., N. Y. C.
Matthews Bros. Mfg. Co	Milwaukee, Wisc.
Budd Wheel Corp	22nd St. & Lehigh Ave., Phila.
Stewart Hartshorn Co	250 Fifth Ave., N. Y. C.
A. G. Spalding & Bros	Nassau St., N. Y. C.
Titeflex Metal Hose Corp	Newark, N. J.
Doehler Die Casting Co	Court, 9th & Hunt'ton Sts., Bklyn.
Norma Co. of America	1790 Broadway, N. Y. C.
Stromberg Motor Devices Co	64-72 E. 25th St., N. Y. C.
United Aircraft Engineering Corp	52 Vanderbilt Ave., N. Y. C.
Anderson Forge & Machine Co	Jeff. Ave. & Conners Creek, Detroit
Wyman-Gordon Co	Worcester, Mass.
Standard Parts Co	Cleveland, Ohio
Mossberg Co	Attleboro, Mass.
Aero Science Club	125 E. 23rd St., N. Y. C.
Dural Rubber Corp	Flemington, N. J.
Aeronautical Society of America	29 W. 39th St., N. Y. C.
Rich Tool Co	Railway Exchange Bldg., Chicago
Hess-Bright Mfg. Co	Front St. & Erie Ave., Phila.
Liberty Starter Corp	200 5th Ave., N. Y. C.
Ericsson Mfg. Co	Buffalo, N. Y.
B. F. Goodrich Co	Akron, Ohio
Champion Spark Plug	Toledo, Ohio
U. S. Light & Heat Co	Niagara Falls, N. Y.
Standard Turnbuckle Co	Woolworth Bldg., N. Y. C.
A. J. Meyer Mfg. Co	2840 Hud. Blvd., W. Hoboken, N. J.
Junior Plattsburg Inc	9 E. 45th St., N. Y. C.
Class Journal Co	239 W. 39th St., N. Y. C.
Edison Electric Appliance Co., Inc	147 Waverly Place, N. Y. C.

Some of the Principal Exhibits Officially Described

(To be continued in the issues of March 8 and March 15)

The Glenn L. Martin Co.

The "Martin Bomber," the newest design of bombing plane, constructed with particular attention to its commercial possibilities, is the central figure of the exhibit of the Glenn L. Martin Company, of Cleveland, O., in Space 14, opposite the Madison Avenue entrance to the Garden. The machine itself is a Government plane shown through the courtesy of the War Department and was delivered via the air route from Bolling Field in Washington to Hazelhurst Field on Long Island.

The Bomber on exhibition is the same plane, with the exception of minor changes in the interior construction of the fuselage, as the twelve-passenger commercial machine for freight, mail, express, and passenger-carrying. The essential parts of the military and commercial planes are identical, so that the advantages of the plane for bombing purposes are as well apparent in the commercial plane. The Speed of the Martin Bomber is well in excess of 100 miles an hour, even with the motor throttled sufficiently to insure durability; the plane leaves the ground in a distance of 200 feet; no larger landing place is required than for a training plane because of low landing speed—these points and many others are brought out by the Martin exhibit and emphasized by photographs, blue prints and specifications.

The twelve-passenger machine is luxuriously fitted with a body of the limousine type. It is electrically heated and affords an excellent view for its passengers through numerous windows. The freight and express airplane is constructed to carry a useful load of 4,000 lbs.

The Glenn L. Martin Company will be represented at the exposition by Mr. Martin, president and general manager of the company; by D. W. Douglas, chief engineer; and by L. D. Bell, factory manager, who is to be in charge of Martin exhibit. Mr. Martin and Mr. Bell will maintain headquarters at the Vanderbilt Hotel during their stay in New York.

The Dayton Wright Airplane Co.

The Dayton Wright Airplane Co. of Dayton, Ohio, have the following exhibits:

The DeH-4 Military Plane

This DeH-4 Military Plane is the first American built Battle Plane and was first flown on October 29, 1917, at the South Field Experimental Station of the Dayton Wright Airplane Co., at Dayton, Ohio.

This ship has been used by the Dayton Wright Airplane Co. for all military tests and experiments for the DeH-4 and has been known as the experimental machine of Canary. About 2500 tests of various kinds, ranging from different propellers to minor changes of the motor have been made and the machine has had about four thousand individual flights.

This ship has spent approximately one thousand hours in the air and has covered a distance of 111,000 miles. Experiments have been made both by altitude and long distance flights. This particular DeHaviland has made twenty-eight trips of one hundred miles or over, including trips from Dayton, Ohio, to Washington, D. C., Dayton to New York and Philadelphia and return.

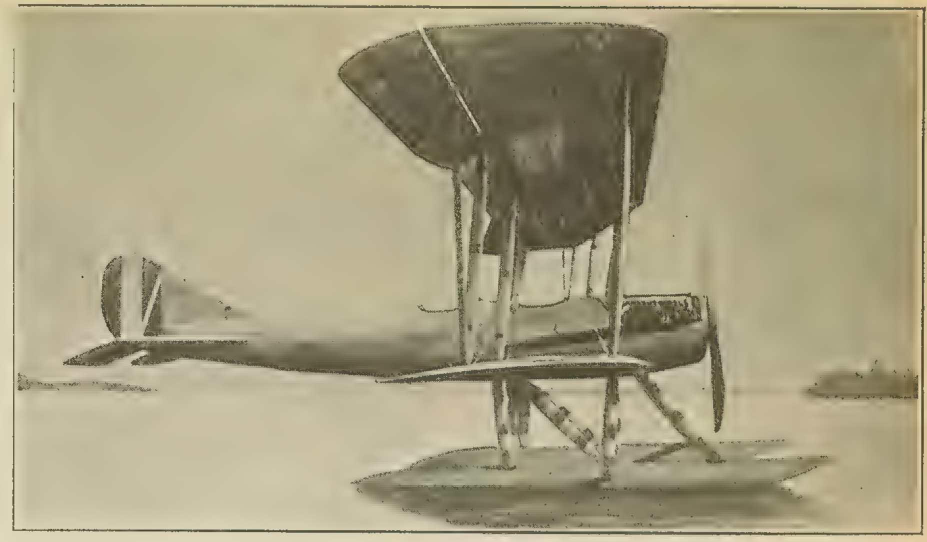
The ship as it is exhibited is in its original condition with the exception of a coat of military paint which was put on to show the Military Plane exactly as it is forwarded to the Army in France. Outside of a patch on the landing gear and a new section at the side cowling, there have been no repairs made to this plane.

The machine carries full military equipment, including camera, bombs, armaments, etc. It might be pointed out that while this ship can be used for each purpose, it is very seldom used for all purposes at the same time and is either operated as a bombing plane and camera plane or as a fighting plane. In case it is used as a fighting plane, the bombing and camera equipment is not carried, which increases the maneuvering ability of the ship.

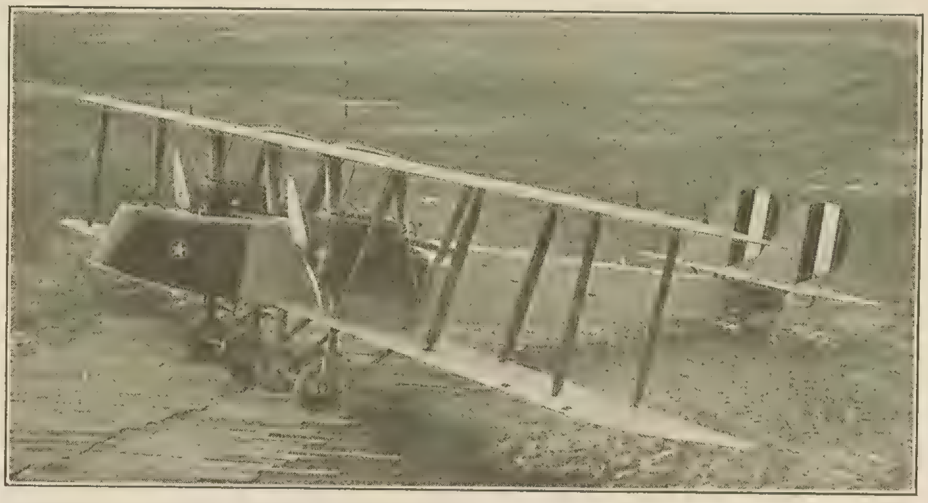
It might also be well to mention the various reports that have been received from the Front, stating that at a height of 17,000 feet, it was the fastest plane on the Front, that it solved the problem of bombing planes without escort of fighting planes.

The two Marlin Guns will shoot 750 rounds of ammunition each at a speed of about 1650 revolutions of the motor, varying in direct proportion to the speed of the motor. The two Lewis Guns will shoot at the rate of 650 per minute.

The wireless apparatus will send eleven miles to another plane and can be heard at a distance of 47 miles by a ground station. It can receive at a distance of 11 miles from another plane and can hear a ground station 27 miles away. The Camera is worked automatically by a wind vane and will take pictures at the rate of 24 a minute. One plate holder contains 24 plates and carries 72 plates in all.



The L-W-F Hydroplane



The All-American Martin Bomber made by the Glenn L. Martin Co. This machine is mentioned in Mr. Klemin's article on "How to Judge an Airplane" in this issue

SPECIFICATIONS

DeH-4 (Canary) Model.

GENERAL DIMENSIONS:	
Wing Span—upper plane....	42′ 5½″
Wing Span—lower plane....	42′ 5½″
Depth of wing chord.......	5′ 6″
Gap between wings.........	5′ 10"
Stagger	12″
Length of machine overall..	31′ 1½″
Height of machine overall..	11′ 9″
Angle of incidence.........	3 deg.
Dihedral angle.............	3 deg.
Sweepback	0
Wing Curve	RAF 15
Horizontal stabilizer angle of incidence	1 to 3 deg.
AREAS:	
Wings — upper, including ailerons	214.36 sq. ft.
Wings — lower, including ailerons	214.36
Center section.............	11.81
Ailerons (each 17.90 sq. ft.).	71.60
Horizontal stabilizer........	38.42
Vertical stabilizer..........	6.00
Elevators (each 12 sq. ft.)..	24.00
Rudder	13.48
Total supporting surface.....	440.53
Loading (weight carried per sq. ft. of supporting surface)	7.75
Loading (per B.H.P.).......	8.2
Factor of safety...........	6.0
WEIGHTS:	
Net weight—machine empty..	2475 lb.
Gross weight—machine and military load..............	3800
Useful load................	870
Fuel	490
Oil	60
Pilot	160
Passenger or other load	160
Total...............	870
PERFORMANCE:	
Speed—Maximum—Horizontal Flight	122 fully & equipped
Speed—Minimum—Horizontal Flight	58
Climbing Speed....	10,000 ft. 10 min.
Radius of action (economical)	4 hours
MOTORS:	
Model—Liberty, Cylinder 12, cycle 4.	
Horse Power (rated) at 1700 r.p.m.	420.
Weight per rated hp. about 2 lb.	
Bore and stroke.................	5 x 7
Fuel consumption per hr. (economical)	27 gal.
Fuel tank capacity..............	88 gal.
Oil capacity provided—including crankcase	10 gal.

MILITARY EQUIPMENT FOR DEH-4 MACHINES

PILOT'S COCKPIT:

2 Marlin machine guns and mounts.
Ammunition containers and empty shell, 2000 rounds of ammunition and clip chutes.
1 C. C. Synchronizer complete with pump.
1 Aldis telescopic sight and mount.
1 Very pistol and cartridges.
2 Wing and one tail navigation lights.
2 Holt flare landing lights.
1 Radio generator and bracket and propeller rating.
1 Heating and lighting generator and bracket and propeller.
Pilot's front ground lens.
Oxygen regulator and bottles and helmet.
1 Heating and lighting switch.
Heated suit.

GUNNER'S COCKPIT:

Bombing equipment consisting of the following:
  Bomb cams.
  Bomb operating lever.
  Bomb safety release.
  Bomb traps for wings.
  Bomb trap and cam connecting rods.
  Wimperis bomb sight.
  Ten bombs, 25 pounds each.
2 Lewis machine guns and mounts, 1067 rounds.
10 Ammunition containers.
2 Ring and bead and wind vane sights.
Radio equipment as follows:
  Inter-phone set complete No. S. C. R. No. 68.
  Sending and receiving set and all lead wires and terminal plugs.
  Antennae reel, antennae wire, antennae fair lead and weight.
  Wireless telegraph set.
  Wireless telephone set.
  1 Camera and equipment complete with 3, 24-plate holders.
  1 Ground lens.
  1 Heated suit.

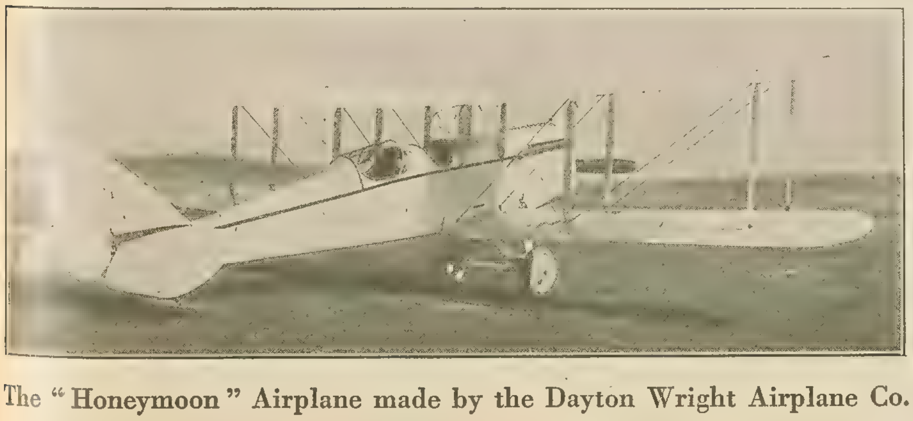
The Honeymoon

The Honeymoon or Three Passenger Ship as exhibited is by no means a theatrical or impractical plane. It has been designed with the intention of making passenger riding in an airplane as comfortable as possible and to this end it has been completely upholstered and equipped with all the luxuries that the most exacting passenger may demand.

The rear seat in rear cockpit is designed for one passenger and is broad and comfortable. A revolving seat is provided for the additional passenger in the rear cockpit. To provide for the comfort of the passengers, a rack has been placed just behind the instrument board containing thermos bottles and sandwich boxes.

The top has been designed with a view to actual flying conditions and while it is not intended that it be put up or lowered while the ship is in flight, it is perfectly practical and should a flight be desired when weather conditions appear unfavorable, there is no reason why the top should not be used. It is also very desirable in cold weather.

This ship, if manufactured for selling, would be priced at about $20,000.



The "Honeymoon" Airplane made by the Dayton Wright Airplane Co.

SPECIFICATIONS

Model—D4K or Honeymoon

GENERAL DIMENSIONS:	
Wing Span—upper plane	42′ 5⅓″
Wing Span—lower plane	42′ 5½″
Depth of wing chord	5′ 6″
Gap between wings	5′ 10″
Stagger	12″
Length of machine overall	30′ 1½″
Height of machine overall	11′ 9″
Angle of incidence	3 deg.
Dihedral angle	3 deg.
Sweepback	0
Wing curve	RAF 15
Horizontal stabilizer—Angle of incidence	1 to 3 deg.
AREAS:	
Wings — upper, including aileron	214.36 sq. ft.
Wings — lower, including aileron	214.36 "
Central Section	11.81 "
Ailerons (each 17.90 sq. ft.)	71.60 "
Horizontal stabilizer	38.42 "
Vertical stabilizer	6.0 "
Elevators (each 12 sq. ft.)	24.0 "
Rudder	13.48 "
Total supporting surface	440.53 "
Loading (weight carried per sq. ft. of supporting surface)	7.75 lb.
Loading (per B.H.P.)	8.2 "
Factor of safety	6.5
WEIGHTS:	
Net Weight—machine empty	2400 lb.
Gross Weight—machine and load	3410 lb.
Useful load	1010 lb.
Fuel	490
Oil	60
Pilot	160
Passengers or other load	300
Total	1,010
PERFORMANCE:	
Speed—maximum—horizontal flight	115
Speed—minimum—horizontal flight	53
Climbing speed	10,000—10 min.
Radius of action (economical)	4 hr.
MOTOR:	
Model—Liberty, 12 cylinder, 4 cycle.	
Horse power—rated at 1700 r.p.m. 420.	
Weight per rated horsepower 2 lb. per hp.	
Bore and stroke	5 x 7
Fuel consumption per hr. (economical)	27 gal.
Fuel tank capacity	80 gal.
Oil capacity provided—crankcase	10 gal.

The Messenger

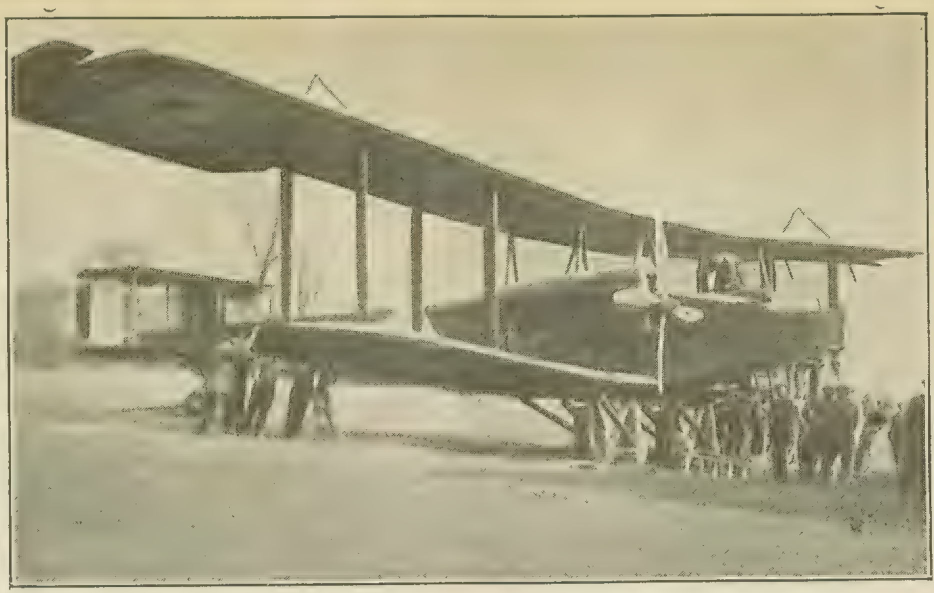
The Messenger was originally designed for War purposes, to be used as a liaison ship taking communications from the front to Headquarters or carrying messages between various armies.

This ship has been somewhat changed for Peace time use and has many features which would make it peculiarly adaptable to commercial or pleasure use. The air cooled motor has removed one of the most perplexing problems in successful flying, radiation, and by taking away the weight of the radiator and water, has enabled the builders to construct a very small ship which is practical and has a large factor of safety.

One of the particular advantages of a ship of this type is its ability to land at a slow speed, forty miles per hour and in a very small area. This machine is by no means an experiment, having been flown at Dayton many times before being taken to New York.

One of the peculiar features of its construction is the fact that no tie rods are used in the fuselage, structural strength being obtained by veneer cross sections. In order to thoroughly test out the practicability of doing away with tie rods, the fuselage was placed on two supports, one at each end and was then made to support the weight of twelve men which it did without showing any signs of strain.

This machine is very economical, using 4 gallons of gas per hour and using practically no oil, the oil being placed in the gas and is used at the rate of about one quart for a gallon. The upkeep and initial cost will be very low, and if manufactured for selling purposes will sell at about $2500.



Handley Page Bomber built by the Standard Aircraft Corp.

SPECIFICATIONS

Model—T. 4. Messenger

GENERAL DIMENSIONS:	
Wing span—upper plane	19′ 3″
Wing span—lower plane	19′ 3″
Depth of wing chord	3′ 3 9/16″
Gap between wings	3′ 8½″ & 3′ 3″
Stagger	9″
Length of machine overall	17′ 6″
Height of machine overall	6′ 1″
Angle of incidence	6 deg.
Dihedral angle	3 deg.—lower wing only
Sweepback	0
Wing curve	D.W.A. No. 3
Horizontal stabilizer-angle of incidence	**1½ deg. minus**
AREAS:	
Wings — upper, including ailerons	**50 sq. ft.**
Wings — lower, including ailerons	56 sq. ft.
Center section	11
Ailerons (each 4½ sq. ft.)	18
Horizontal stabilizer	7.5
Vertical stabilizer	0
Elevators (each 2¾ sq. ft.)	5.5
Rudder	3.33
Total supporting surface	117.0
Loading (weight carried per sq. ft. of supporting surface)	5.43 lb.
Loading (per B. H. P.)	17.2 "
Factor of safety	**6.½**
WEIGHTS:	
Net weight—machine empty	476 lb.
Gross weight—machine and load	636 lb.
Useful load	
Fuel	
Oil	
Pilot	
Load	
Total	
PERFORMANCE:	
Speed—maximum—horizontal flight	78 m.p.h.
Speed—minimum—horizontal flight	40 m.p.h.
Climbing speed	3000 ft. 10 min.
MOTOR:	
Model ——, Cylinder 4, Cycle 2.	
Hp.—rated at 37, r.p.m. 2000.	
Weight per rated hp.	3.7
Bore and stroke	3⅜ x 4½
Fuel consumption per hr.	4 gal.
Fuel tank capacity	12 gal.
Oil capacity provided—crankcase	1 qt. oil to gal. gas
No tie rods in fuselage, supported 12 men.	

The Limousine, although never having been constructed in life sized ships, has been carefully designed for real flying and has been subjected to tests in a wind tunnel with a view to prove its practicability.

Had the war ended sooner and the Company been able to devote its attention to this type of work, a ship of this nature would have been completed in time for the show, but owing to the Company's activity in war work, there was no possibility of showing anything larger than in model. The model is six feet long and has a wing spread of 10 feet 7½ inches.

The Dayton Wright Airplane Co. is represented by: H. E. Talbott, Jr., President; G. M. Williams, General Manager; W. S. Whittaker, Ass't to Gen. Manager; H. M. Rinehart, Chief Pilot; B. Whelan, Pilot; L. C. Luneke, Ass't Chief Engineer; J. M. Jacobs, Experimental Engineer, and C. S. Winston, Super. Final Plane Dept.

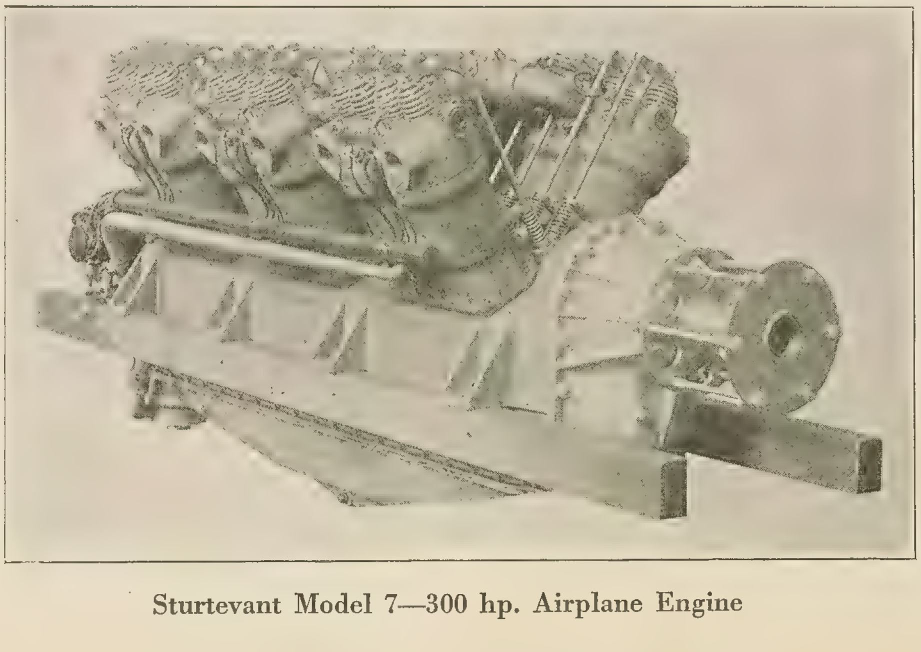
The B. F. Sturtevant Co.

The exhibit of the B. F. Sturtevant Co., of Boston, Mass., consists of 3—210 Horsepower, 8 Cylinder Airplane Engines; 1—300 Horsepower, 12 Cylinder Airplane Engine; a Supercharging Device; and a Gasolene Electric Generating Set arranged for Anti-Aircraft Searchlight Service.

The 8 Cylinder Engine which is rated 210 Horsepower at 2250 R. P. M. develops a maximum of 240 Horsepower. Its weight complete with all accessories, but without oil or water is 480 lbs.

Ignition is effected by 2—8 Cylinder High Tension Magnetos in connection with a double set of Spark Plugs.

Two types of Carburetor Installations are shown. For gravity feed a Duplex Carburetor is located at the rear end of the sump, and is attached to the cylinder heads by long water-jacketed inlet pipes. An overhead arrangement is also supplied in which two carburetors are used, each feeding one bank of cylinders through water-jacketed manifolds.



Sturtevant Model 7—300 hp. Airplane Engine

Cooling Water is circulated by a large centrifugal pump mounted on the timing gear case. To the pump cover is attached a thermostat which maintains a constant water temperature in the engine at all times.

The Propeller Shaft operates a 3/5ths of the crankshaft speed or normally at 1350 R. P. M. The B. F. Sturtevant Company was first in the United States to produce a successful Geared-Down Engine. Its faith in this construction is exemplified by the fact that the Company has manufactured no direct drive engines since the introduction of the Geared Type early in 1915.

A Supercharging Apparatus exhibited with one of the 210 Horsepower Engines is of especial interest. The device consists of a small Rotary Compressor arranged to be driven at ten times the crankshaft speed. It is equipped with a Barometric Regulator which automatically controls the amount of air compression in proportion to the altitude, so that sea level air pressure is maintained on the carburetor and practically full engine power is developed, even at very high altitudes.

The Model 7—300 Horsepower, 12 Cylinder Engine is similar in general construction to the 8 Cylinder Model. The normal crankshaft speed is 2000, and that of the propeller 1200. The cylinders are cast in pairs, and have removable heads.

Two 12 Cylinder Magnetos are mounted on platforms at the timing gear end of the engine. The two carburetors which are located in the Cylinder Vee are the Double Barrel Type, and are connected to the water-jacketed manifolds at points midway between the cylinder blocks.

The Anti-Aircraft Searchlight Set is a unit which was brought out by the B. F. Sturtevant Company for the United States Marine Corps. It comprises a 6½ K. W. Electric Generator; a 4 Cylinder Gas Engine; Cooling Radiator; Fan; Gasolene Tank; and Switchboard. The entire unit is protected by a folding steel hood. In addition to the above size, the B. F. Sturtevant Company builds 5, 10, 15, and 22½ K. W. Gasolene Electric Generating Sets for lighting and power purposes.

A large Experimental Department is maintained by the B. F. Sturtevant Company for the investigation of Engineering Problems and the conduction of Developmental Tests on Gas Engines. Too great emphasis can hardly be laid upon the value of this Department's Work. Its efforts are in no small measure responsible for the unusual progress of the Sturtevant Engines, and the markedly successful accessories which have been brought out from time to time.

The following persons will represent the B. F. Sturtevant Company: B. S. Foss, Treasurer and Manager of Aeronautical Department; H. E. Morton, Chief Engineer, Gas Engine Department; H. Nutt, Assistant Chief Engineer, Gas Engine Department, and J. H. Yelle, Field Engineer.

L. W. F. Engineering Co.

The L. W. F. Engineering Co., Inc., of College Point, L. I., have these machines on exhibition:

Model VH-1

TWO PASSENGER HYDROAIRPLANE

RECONNAISSANCE BIPLANE, MILITARY TYPE

This machine is similar to the L-W-F Model V-1, but is equipped with pontoon gear instead of wheels. It is powered with a 140 H.P. Sturtevant engine and has an air endurance of six hours. The fuselage is of the L-W-F standard construction, the true monocoque type. Single control is installed in the rear cockpit, but this machine may be conveniently equipped with dual control. The high speed is 85 miles per hour and the low speed is 42 miles per hour. The climb is 3500 feet in ten minutes. The weight fully loaded is 2700 pounds with a total lifhting surface of 490 square feet. Model V-1, which is similar to model VH-1 except that it is equipped with landing gear instead of water gear, was used extensively for advanced training in this country and in France. A number of these machines are now in use on the Czecho-Slovak front.

Model VH-1 has a useful load of about 1000 pounds and would be ideal for a water express route or for a sporting machine. The fuel consumption and cost of operation of both Model V-1 and Model VH-1 are very low. This machine will be on exhibition at the L-W-F booth at the Aeronautical Exposition.

Model G-3

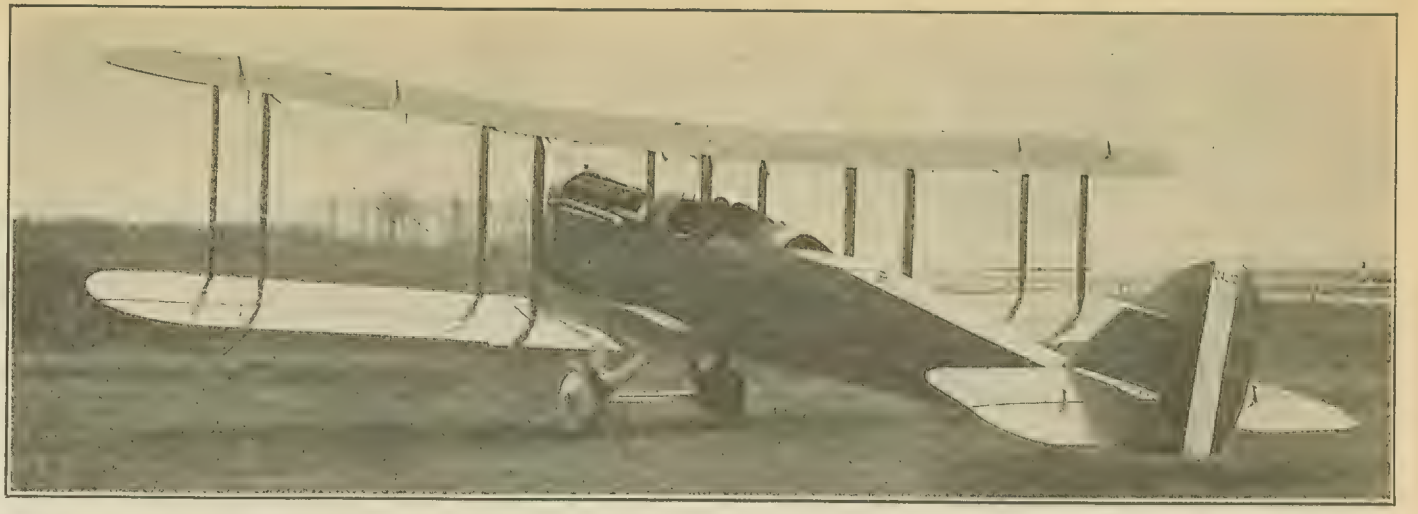
TWO SEATER FIGHTING BOMBER

This machine is a two man biplane, land tractor, military type, armored and carries an armament of six machine guns and four 120 pound Barlow bombs. It is powered with a 425 to 450 H.P. Liberty twelve cylinder motor and has an air endurance at full speed of four hours. The radiator is fitted into the wing curve. A spun aluminum nose streamlines the propeller hub. The fuselage is of the L-W-F true monocoque type and a sturdy steel military chassis is used. Four synchronized guns are mounted alongside of the motor to fire through the propeller. One gun is placed on the flexible mount at the rear cockpit. Another machine gun firing through a hole cut in the lower rear of the body, protects the machine from attack from under the tail. The machine is equipped with dual stick control and the control surfaces are all balanced. The slightest touch on the stick is sufficient to change the attitude of the machine. The pilot has come out of a nose dive and tail spin with a thumb and two fingers on the stick. With a load of 1400 pounds in addition to its empty weight of 2675 pounds, this machine made 134 miles an hour high speed and climbed 10,000 feet in nine minutes and eighteen seconds. This machine will be included in the L-W-F exhibit at the Aeronautical Exposition.

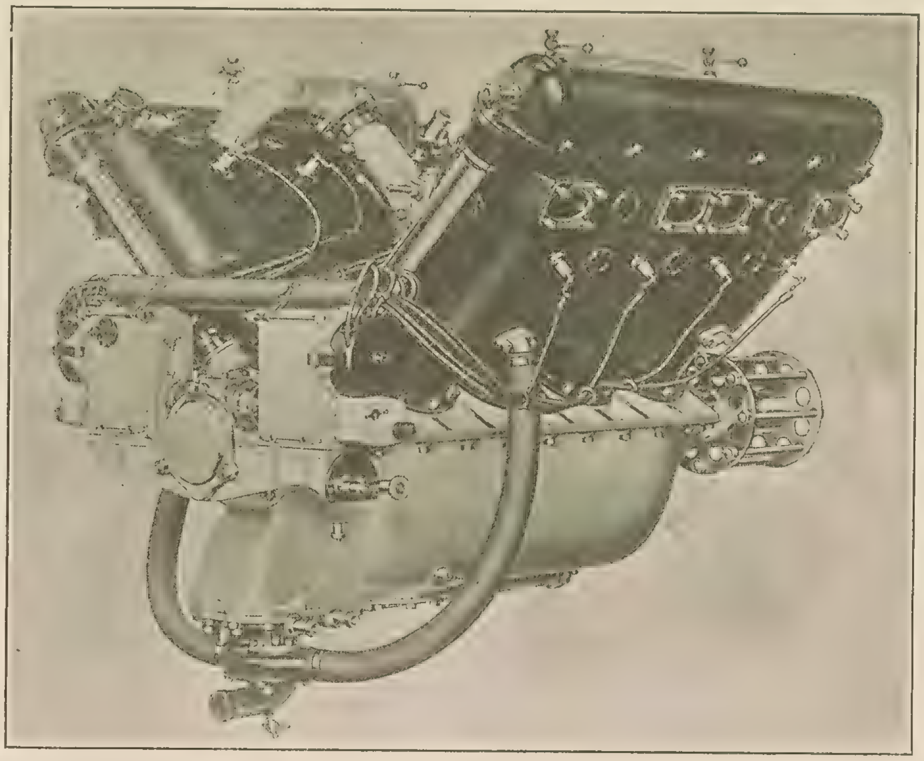
Model HS-2-L

THREE SEATER FLYING BOATS

This machine is a Naval Patrol Biplane, carrying two pilots, a gunner, a machine gun, and four large bombs. It is powered with a 360 H.P. Liberty twelve cylinder motor and has an air endurance of full speed for four hours. It has a span of 75 feet, has a weight empty of 4500 pounds and carries a useful load of about 2200 pounds. A machine gun is placed on a flexible mount in the front, or gunner's cockpit, and the four bombs are placed under the wings. A special bomb sighting apparatus is also mounted in this cockpit. It is equipped with a complete radio outfit and dual control. The ailerons and rudder are balanced and floats support the wing tips. The keel surface is increased by two non-skid planes placed on the upper wings. This machine is used by the Naval Aerial Patrol, both in this country and abroad. It is equipped with a complete set of specially designed Naval instruments, including gyroscopic compass and lights for night work. Fully loaded it has a speed range from 45 to 91 miles per hour and a climb of 3000 feet in ten minutes. This machine is adaptable for a water express route or passenger transportation. This machine will be included in the L-W-F exhibit at the Aeronautical Exposition.



The De H-4 with mail compartment in the rear



Hispano Suiza Engine 300 h.p. built by the Wright-Martin Aircraft Corp.

SE-5A built by the Curtiss Aeroplane & Motor Corp.

The L. W. F. Engineering Co. are represented by the following at the Exposition: Capt. J. M. Foote, Chief Test Pilot; Glenn D. Mitchell, Chief Engineer; R. J. Hoffman, Aeronautical Engineer; A. G. Flachbar, General Superintendent, and others of the Engineering staff and Production Department.

Wright-Martin Aircraft Corp.

The Wright-Martin Aircraft Corp. of New Brunswick, N. J., exhibit the following engines:

1. One 180 h.p. Hispano-Suiza motor, complete, mounted on test block.
2. One 300 h.p. Hispano-Suiza motor, complete, mounted on test block.
3. One exhibition board containing dissembled major parts of 180 h.p. Hispano-Suiza motor.
4. One exhibition board containing dissembled major parts of 300 h.p. Hispano-Suiza motor.
5. One Lewis & Vought biplane, with 150 h.p. Hispano-Suiza motor installed.
6. The famous Loening monoplane, with 300 h.p. Hispano-Suiza motor installed. (This is the famous machine that has made world's altitude and speed records.)

The names of the persons who will officially be present this exhibition are: John R. Cautley and Alfred S. Hearn. The following list of officials of the Wright-Martin Aircraft Corporation who will be in attendance from time to time is as follows: George H. Houston, President; William F. McGuire, Vice-Pres.; James H. Anderson, Vice-Pres.; Henry M. Crane, Vice-Pres. & Chf. Engr.; William P. Anderson, General Factory Mgr.; John R. Cautley, Manager, Sales Order Division; A. Ludlow Clayden, Consulting Engineer; Alfred S. Hearn, Manager of Advertising; H. L. Pope, Engineering Department; Guy Vaughan, Quality Manager, and Alfred Weiland, Production Engineer.

Hartzell Walnut Propeller Co.

The Hartzell Walnut Propeller Co. of Piqua, Ohio, exhibits eight or ten of the various propellers which have made exceptional performance records; also several of the small propellers which will likely become very popular for small single-seat pleasure planes.

The company's booth is in charge of Frederick Charavay, Chief Engineer. The plane designed by Grover Cleveland Loening which made such exceptional records at the McCook Field in Dayton was equipped with a Liberty propeller. The Lewis & Vought Aircraft Corp. have been using these propellers on all of their planes, a number of which have made exceptional records.

Frederick Charavay, Chief Engineer, is particularly familiar with the Hispano-Suiza motor, having been in the employ of the Wright-Martin Aircraft Corporation before his alliance with Hartzell Company. His familiarity with every part of the motor and its design exceptionally equips him to fit any aeroplane with a propeller which has the Hispano-Suiza motor installation.

Among the company's recent propeller engineering problems was that of a propeller built for the Gallaudet Aircraft Corp. This propeller was designed and built up in such a way that it could be fit in the fuselage of the Gallaudet plane and is driven by a set of gearing from the engine which sets in the front of the plane. This propeller was ten feet in diameter, having a hub hole of 21 inches in diameter. The peculiar shape required a number of special jigs, etc., for its construction.

Society of Automotive Engineers

The exhibit of the Society of Automotive Engineers consists of a series of sheets showing the various standards and recommended practices of the Society. It is also planned to use the booth as a reception room where members visiting the exhibit can meet their friends and keep their appointments. The representatives at the Exhibition will be: Herbert Chase, Assistant Secretary; H. D. Dabney, Office Manager; R. F. Burnett, Manager Standards Dept; D. E. Heyward, Standards Department, and John M. Lloyd, Publication Department.

How to Judge an Airplane

(*Continued from Page* 1)

The front edge of the wing is termed the "Leading Edge." The rear edge of the wing is termed the "Trailing Edge."

The wings sustain the whole weight of the airplane, and must therefore be suitably strengthened by what is known as a system of interplane bracing. There are first of all wooden posts of a faired shape, which are known as "Interplane Struts" or simply "Struts," placed between the wings as shown in the diagram. To transmit the loads from the wings to the body or fuselage, and complete the truss interplane wires are used, termed respectively "Flying Wires" and "Landing Wires."

To house the engine, the passenger and pilot, the instruments, etc., we have the "Body" or as it is more often called the "Fuselage."

To keep the wing truss in alignment, and maintain the right distances, cross wires are carried between the struts, which are termed "Incidence Wires."

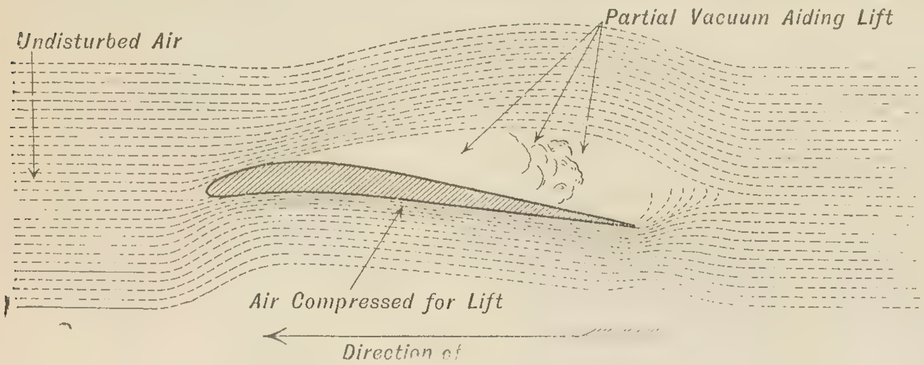


Fig. 3.—Showing Flow of Air Around an Aerofoil.

To house the passenger and pilot, we have the two "cockpits."

In order that when a machine lands, it may not damage the rear part of the Fuselage and the Tail Surfaces, there is attached to the rear part of the body a Tail Skid which takes up the shock of landing in the rear, and also helps to slow up the machine when it is rolling on the ground after landing.

There remains the important control surfaces. There are first the "Right and the Left Aileron" which roll the machine, or if it rolls help to bring it back to its true position.

These Ailerons are so connected up, that when one goes up, the other goes down. If the right Aileron is pulled up, the left Aileron is pulled down simultaneously and the machine rolls down on the right side.

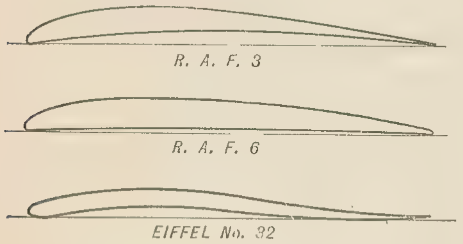


Fig. 4.—Three Typical Wing Sections.

R. A. F. 3 heavy camber, good lift, poor efficiency; R. A. F. 6 a good, all round wing; Eiffel 32 a fast wing, with poor lift.

To pitch the machine, nose it up or head it down, we have the "Elevator Flaps." If the Elevator Flaps are pulled up they receive the wind on their upper surface, and the machine consequently noses up. If the Elevator Flaps are pulled down, they receive the wind on their lower surface, and the machine consequently noses down. Here it is very easy to imagine that this will happen.

To give longitudinal stability to the airplane, and the meaning of this we shall explain fully later, a fixed horizontal surface is placed at the rear end of the fuselage and this is known as the "Fixed Stabilizer."

To guide the machine on its course, a "Vertical Rudder" is used. When this rudder is pulled to the right, so that the wind hits it on the right, the whole machine swings to the right and vice-versa. To give directional stability, and this again we must explain later, a fixed "Vertical Fin" is placed in front of the rudder.

With the radiator to cool the engine, the gasoline tanks in the fuselage to supply the fuel, these are the main parts of an airplane.

The Meaning of Efficiency

Aerodynamics, the science of air movement, is very largely a study of efficiency. To overcome drag requires power, and the less drag we have to exercise to sustain a given weight, the greater is the efficiency. The efficiency of an airplane is to be obtained by (I) having a good wing with a large lift to drag ratio as the aeronautical engineer calls it. (II) by cutting down as far as possible the resistance or drag of the rest of the machine, this being called parasite resistance, thus picturesquely termed because everything outside of the wings entails drag, but does not provide lift.

The first thing to look for therefore on an airplane is a good wing section, and an airplane wing is called by many names. Sometimes a "wing section," sometimes an "aerofoil," sometimes a "cambered plane." It is mainly because a wing section has a better lift to drag ratio, than a flat plate, that we use such cambered shapes. Figure 3 shows such an aerofoil, and we can tell by just looking at it, that it will go more smoothly through the air than a flat plate. Fig. 3 also illustrates roughly the action of the air on an aerofoil. Strange to say it is not the compressed air on the under side that does most of the lifting work. Nor is it the partial vacuum, due to eddying, on the upper side of the wing, which gives most of the lift.

The science of aerodynamics has not yet reached a point where the properties of a wing can be predicted without special tests. Still it is possible to tell by eye what constitutes a good wing, and even to tell by just looking at it what are likely to be its characteristic properties. Look for instance at the three wings of Fig. 4. The mysterious letters R. A. F. stand for Royal Aircraft Factory. Eiffel is the name of the famous builder of the Eiffel tower. These wings are very largely used, although much better wings have recently been developed by American designers, The R. A. F. 3 is a wing with a deep hollow or camber; it will provide big lifting power and will be useful on a great big heavy seaplane. The R. A. F. 6 has a medium camber, it will be fairly efficient and also give good lift. The last of the series is very thin and speedy looking. It will be efficient but give only small lift; this wing would only be useful on small, very fast machines. Hundreds of wings have been tried out, and dozens of good wings are in use. Nothing eccentric has ever succeeded, but a great deal still remains to be done.

Another very important point in judging a good wing is the spar or beam depth available. Inside every wing there are, in the modern airplane, two spars or beams, which are placed one about 25% of the wing depth from the front or leading edge, and one about 60% of the wing depth or chord from the leading edge, and these beams carry the main load of the wing. Now just as a thin plank may be broken across a man's knee when placed flat on it, and yet becomes very hard to break when it is held on edge so the beam of an airplane should be deep. In a fast, flat wing this is difficult to obtain, in a wing with a big depth the necessary strength can be much more easily secured, and the depth of the beam is therefore an important point to consider.

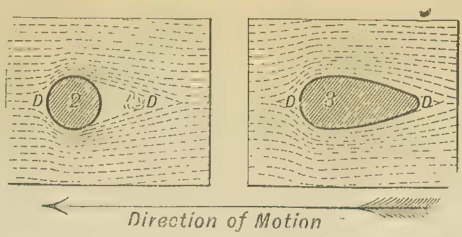


Fig. 5.—This Shows the Turbulent Flow Round a Circular Wire and the Easy Flow Round a Streamline Shape.

When it comes to the consideration of the efficiency of the rest of the machine, a great deal more can be done by eye. Everyone has a feeling for "streamline" in boats. A good boat or yacht just looks as if the water flowed round it easily, just looks streamline. The same streamline idea applies to an airplane. A great big square, unrounded body or fuselage will not be as good a streamline proposition and therefore offers more resistance than a fine well rounded body, fishlike or submarine like in shape. The struts between the two wings of a machine have a streamline shape. Up to very recent times, round wire or cable was used to brace the structure of an airplane, but now the careful observer will notice one or two machines in which solid wire is used no longer of a round cross section but of a stream-lined section. The employment of such wire on a plane may not seem to be a matter of great importance, yet this refinement will increase the speed of an airplane some 4 or 5 miles an hour. Fig. 5 shows the turbulent flow for a round wire, and the nice, easy flow round a streamline shape.

Again in looking at some airplanes, you will see a great complication of wires, both in the main structure of the wings and in the support of the surfaces at the end of the machine, what are technically termed the tail surfaces. In the early days such wires were present in hopeless profusion. Control wires also to the rudder, elevator and ailerons had the greater part of their length exposed. But on a modern clean-cut job, the number of wires in the main structure has greatly diminished. This is one of the most easily judged points about a machine, and yet one of the most important.

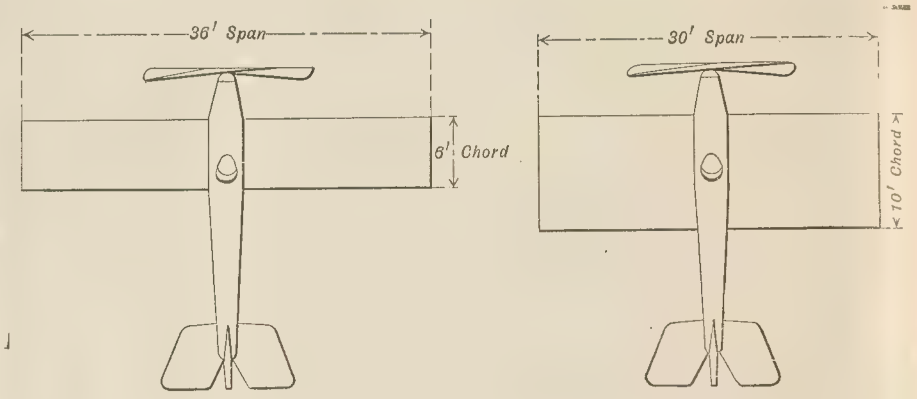


Fig 6.—In One Case $\frac{\text{Span}}{\text{Chord}} = 6$; in the Other Case, $\frac{\text{Span}}{\text{Chord}} = 3$. The High Aspect Ratio Wing Is Much More Efficient, and Looks It.

Some Other Points That Contribute to the Efficiency of the Wings

Besides the actual shape of the wing, there are one or two other points that contribute to their efficiency. First their plan form, and above all what is known as the aspect ratio. In Fig. 6 we have two wings, one which has a span six times the width, the other which has a span or length of only three times the width or chord. The aspect ratios are said to be 6 and 3 respectively.

The wing of larger aspect ratio will give slightly more lift and a good deal more efficiency than the wing of aspect ration 3. The reasons for this are too complex to be discussed here. To see what the aspect ratio of the wings is therefore an interesting point about the plane. On the average biplane the aspect ratio will be somewhere about 6 or 7. The reader may ask why, since large aspect ratios are so advantageous higher figures than this are not employed. This is because with larger aspect ratios the length of the wing becomes unwieldy, the wing structure is harder to build, and also the resistance of the interplane struts and wires increases. In aeronautics it is a peculiar thing that whatever principle gives us an aerodynamic advantage, its employment to the extreme is not advisable, because this brings in its train some disadvantage.

Another point that it is interesting to examine is the distance apart of the two wings of a biplane. A monoplane wing is always more efficient than the wing of a biplane, but its structure is difficult particularly for large machines. When we do build a biplane it is necessary to keep the wings apart as far as possible, to make what is known as the gap, large. This term is illustrated in Fig. 7. But a machine in which the gap is extremely large loses in efficiency because the struts become so large and heavy, the wires so long, so that the weight and resistance of the interplane truss becomes prohibitive. Here again we see that the design of a good airplane is a question of compromise, and the most skilful compromise produces the best machine.

Another arrangement which tends to improve the lift and efficiency of a biplane is stagger. This is also shown in Fig. 7 where the upper wing is "staggered" forward of the lower wing.

The Loading of the Wings and Landing Speed

One of the first things to ask about a machine, after the question of wing section, aspect ratio and dimensions af gap have been settled, is: what is the loading per square foot. If an airplane

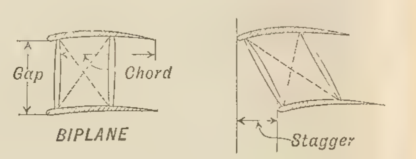


Fig. 7.—Illustrating the Terms Gap and Stagger.

weighs 2000 pounds fully loaded and has a wing area of 400 square feet, its wing loading is said to be 5 pounds per square foot. This question of wing loading is of the utmost importance since on it depends the landing speed. If for a given weight of airplane there is a small wing area then to fly at all, the machine must maintain a high speed. Even on landing when the pilot takes the very smallest speed he can maintain, there would be with such a machine a very high speed. A military machine, a fast single-seated scout for instance must have speed above all things, and it is given a small wing area. The man who flies a single-seated scout must of necessity be an expert, he must be able to out-maneuver his enemy in the air, and he must take a certain risk on landing which his skill will minimize. The visitor to the show if he sees the Thomas-Morse scout will be rather surprised at the small wings they carry. For one square foot of wing such machines will carry a load of 8 or 9 pounds, and will land at 65 to 70 miles an hour. But when it is a question of a school machine such as the Curtiss JN which has been used in such enormous quantities during the war, the loading will not be much more than 5 pounds per square foot, and the landing speed somewhere in the neighborhood of 43 miles an hour. Airplanes for pleasure purposes may have an even lower wing loading and lower landing speed. A prospective purchaser of a pleasure craft must look into such a point very carefully.

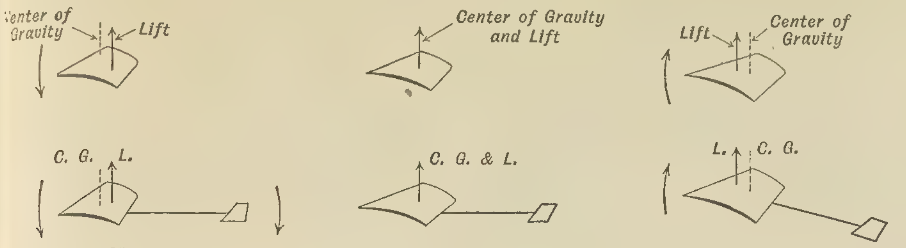


Fig. 8.—Showing How the Stabilizer Helps to Balance a Plane Longitudinally.
The lift force is in rear of the center of gravity, which tends to make the wing dive; in the lower view it is shown how the downward pressure on the tail counteracts this tendency. Shows a surface with lift passing through the center of gravity. The wing is therefore balanced and tail pressure is not needed unless a sudden change in angle is effected. The line of lift force is ahead of the center of gravity. The tendency of the wing to rear up is offset by upward pressure on the tail; note lower view.

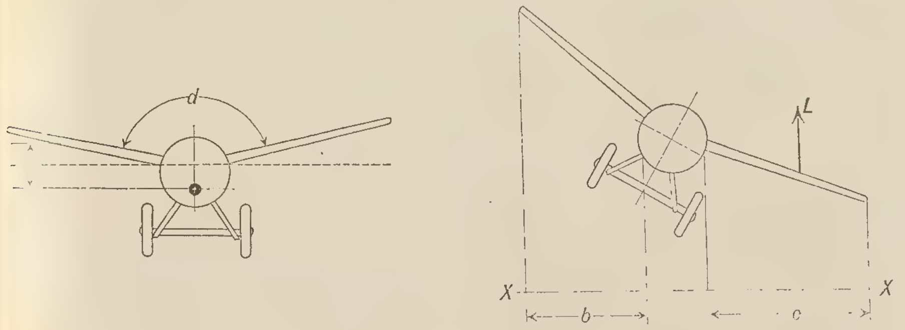


Fig. 9.—This Shows a Monoplane with a Dihedral "d" Between the Wings. In Normal Flight the Lift on the Two Wings Is the Same. When It Rolls Down on the Right Hand Side, the Dihedral Tends to Restore It to Its Normal Attitude.

Power and Speed

All things being equal, that airplane will have the greatest speed and climb which has the smallest weight per horse-power. An exceptionally good design will get more speed out of a given weight per horse-power, a poor design will fall below the average, but as a rule the weight per horse-power will be a very fair criterion of what a machine can do. The visitor can check up roughly the claims and figures of an airplane manufacturer by this simple query: What is the weight per horse-power?

Stability

Stability is a subject in which the layman must place almost entire confidence in the airplane designer. To obtain equal longitudinal balance, the center of gravity of the whole machine must be situated at about one-third of the mean chord of the airplane, which is a line halfway between the upper and lower wing. This is not a rigid rule, however, and there are numerous variations from it. A very important rule in securing stability of the machine is that all expendible material, such as fuel, be situated as near as possible above the center of gravity of the machine. Suppose as an extreme case, that the gasoline tank were placed at the extreme end of the machine. When full, there might be perfect balance, but when the tank became empty, there would be a great tendency for the machine to be nose-heavy, to dive down by the head. The good stable machine, when disturbed from its normal flight attitude, tends to recover its equilibrium as long as power is on, and when the power is off, it should take up a gentle gliding attitude and come safely to earth. Unfortunately, the wing itself of the airplane is unstable. The movement of the air forces on it, or the center of pressure is such that when the airplane heads down accidentally, the center of pressure tends to head it down still further. If the airplane noses up, the center of pressure movement is such that it noses up still more. It is to correct this that the stabilizer is employed, and its action is clearly illustrated in Fig. 8 much better than by a wordy explanation.

Lateral stability is even harder to understand than longitudinal stability. The dihedral angle of the wings, such as shown in Fig. 9 helps some. When the machine rolls to one side, the forces of the wing which is down will have a greater vertical effect than on the other side, and the machine tends to come back to its correct position.

Besides the dihedral, there is the lateral fin area of the machine, or the area of the machine as seen from the side. There should be a preponderance of this fin area behind the centre of gravity of the machine. If the major part of the fin area is forward of the centre of gravity of the machine, then when the side gust hits it, it will spin round dangerously. It is to obviate this spinning tendency that we use the fixed vertical stabilizer at the end of the airplane. This fixed vertical stabilizer will be seen on every machine at the show.

Manoeuvrability

At first sight, it would seem a very hard matter to check up the manoeuvrability of an airplane by a cursory examination. But there are certain fundamental principles, which can be readily applied to any machine. For longitudinal manoeuvrability, that is ready ability to pitch the machine up and down, the first thing is to have the weights closely bunched together. If the weights are spread far apart the machine will have considerable inertia and will respond slowly to the action of the elevator. In a skilfully designed plane the main elements of weight, motor, tank, pilot and passengers, will be close to the center of the gravity.

Vision

In military airplanes vision and range of gun fire are all important. In commercial airplanes, vision alone remains, but poor vision can bar the success of any plane, however well designed it may be otherwise. To judge vision again, it is absolutely essential to get into the pilot's cockpit. Can you see ahead? Is all clear over the sides? Can you see to land, when the machine is heading down, and an error in judging distance may be fatal?

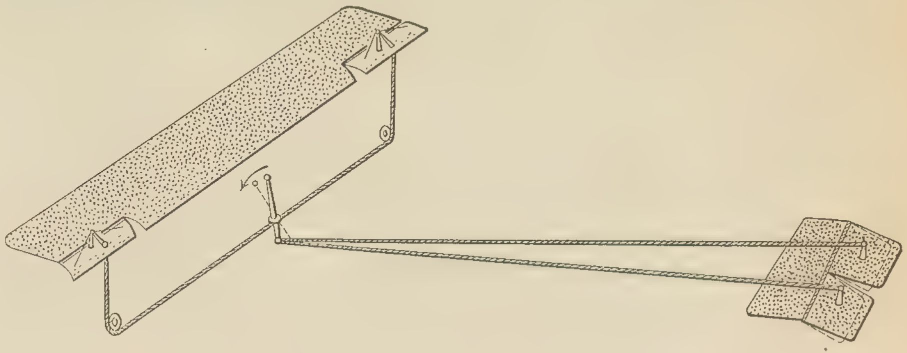


Fig. 10.—Diagram of the "Stick" Control, Which Works Both Ailerons and Elevator.

The Control System and the Cockpit

One of the first things to do in judging the control system is to get into the pilot's cockpit and actually handle the controls. In the cockpit we have in the modern airplane the joy stick which by fore-and-aft movement controls the elevator, by lateral movement controls the ailerons. Considering the large air forces present in a machine, it is essential that no strength is wasted in moving the stick by friction or binding. It must be absolutely free. As a rule, in straight-away flying the stick is moved very gently to one side or the other, through a few degrees, and the greatest difficulties for a novice are to avoid overcontrolling. But at the same time occasions may arise when the stick has arranged as to fit the length of the average person's legs, and his heel should to be moved most violently. Sitting in the cockpit, you can tell at once whether the cockpit is so arranged that these violent movements are permissible, without the stick jamming into the pilot's stomach, or hitting against the sides of the fuselage. The rudder bar should be so arranged as to fit the length of the average person's legs, and his heel should not drag on the floor when the bar is moved. These are apparently small points, but they assume the utmost importance in flight.

The instruments should be reasonably well aranged on the dashboard, and cocks, throttle levers, spark levers, etc., easily visible. Fig. 10 shows the action of the stick on elevator and wing flaps.

Structural Strength

Structural strength is by far the most difficult thing in an airplane to judge by inspection. For struts and cables it is possible to tell something by merely loking at dimensions. But how about the main internal members, the spars of the wings, the longerons of the fuselage? It may be safely said that no machine of a new type should be flown, until it has undergone a sand test, in which the plane is loaded to destruction with sand-bags. And in such a sand-test, for a commercial machine a factor of safety of seven at least must be insisted upon.

Wing Construction

In Fig. 11 we see a diagram of the details of wing construction. The main members runing the full length of the wing are called the spars. The cross members joining the spars together are called ribs. There are two kinds of these, compression ribs and the web ribs. The function of the web rib is merely to support the linen covering of the wings and to resist the lifting force of the air. The function of the compression ribs is not only to resist the lifting force of the air, but also to take the thrust due to stay wires.

Fuselage, Chassis and Skid Construction

Fig. 12 shows in very clear, diagrammatic form the main parts of a fuselage of very common type. The engine bearers are made of spruce or ash, the longerons of spruce or ash. There is a continuous truss from the front to the rear of the machine, and the whole is covered over with doped linen. The chassis and skid are clearly seen on every machine at the show.

Types of Machines

The best way to make a comparative study of the types of machines is at the show itself.

See the SE-5; the DH-4; the Curtiss JN-4 H and the Glenn L. Martin bomber.

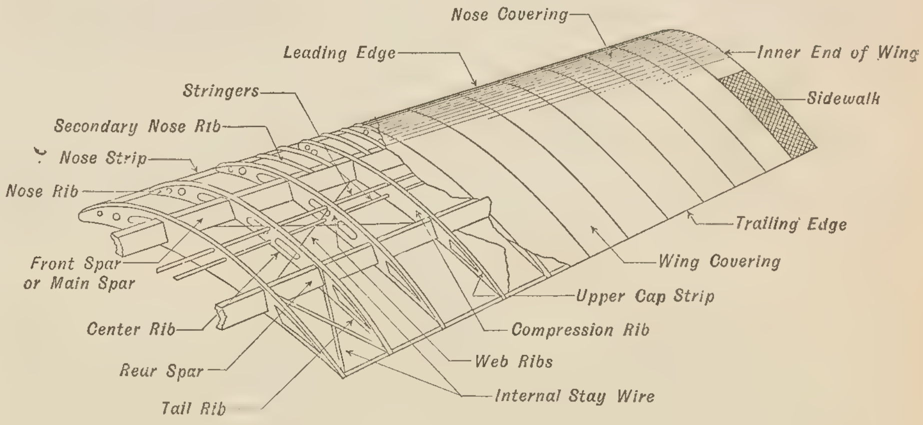


Fig. 11.—Details of Wing Construction.

ANNUAL CIRCUS TO BE HELD AT ROCKWELL

Great Success of the First One Presages Many Others

A SPECTACLE OF WONDERS

Official Decoration of Major Carl Spatz and Major Kenneth Marr and the 64th Balloon Company Is Commended

Rockwell Field, in its World's Greatest Flying Circus, held at the field on North Island, in San Diego Bay on February 2, instituted what promises to be an annual occurrence that will supplant in popular favor the time-honored sawdust ring, annual football games, Mardigras, and every other fete that makes its yearly round.

By permission of Lt. Col. Harvey B. S. Burwell, Commanding Officer, the entire field and its equipment were turned over to the use of the circus. As the Rockwell Field *Weekly Filght* puts it: Hundreds of intrepid aviators, in the roles of circus men, risked their lives in the performance of the most spectacular feats known to the flying game; the big top was limited only to the cloud-flecked sky; huge battleplanes were the horses ridden; and the god of chance was the ringmaster. A capable director he proved, too, for not an accident happened to mar the entire flying program.

There were sham battles and all the strategic moves of air warfare, both in single encounter, pursuit, and formation. Parachutes were dropped from airplanes, and a captive observation balloon, brought from the Arcadia Balloon School, demonstrated parachute drops from the basket of its big cigar.

"Get 5 Planes and Become an Ace"

The concessions or side-shows of the circus were novel and aeronautical. A shooting gallery had small airplanes for targets and a sign read: "Get 5 planes and become an ace." Nearby was a tent where one could get Flying Instructions for a quarter of a dollar. Over at another booth a sign read: "Are you physically fit to fly 30,000 feet in the air, with both feet on the ground? Come in and try." In another booth many talked over the new wireless telephone—these are but samples of the many. Old-fashioned Southern barbecued meats. cooked over wood coals, were served in some of the booths, and in others fake cabaret stars danced and sang.

The crowd came by train and by motor, and, despite threatening weather, was one of the largest San Diego has seen. For most, it was their first close-up view of Rockwell Field. All were amazed at the extent of the improvements; at the buildings, the paved streets, the splendid flying field, the equipment, and the ability and discipline of the men. It was the first time in more than twenty months that the general public had been permitted to make an inspection of the aeronautical shops. Each department of the flying school gave, as part of the day's entertainment, lectures on its own work. Experts explained the various types of motors, guns and planes; and every piece of machinery was, besides, well placarded to show its particular use.

Official Decorations

The climax of the day, however, was not in the circus itself. It was instead a replica of what has taken place many times on the battle front in France, with full military ceremony. This was the presentation of the Distinguished Service Cross to Major Carl Spatz and of the Croix de Guerre to Major Kenneth Marr. The presentation was made by Col. H. H. Arnold, District Supervisor of the Western District of the D.M.A. The Quartermaster General had been directed to have the cross for Major Spatz sent to the Commanding Officer of the field, and the Secretary of War had directed that upon its receipt it be presented with appropriate ceremonies. The citation of Major Spatz for extraordinary heroism during the St. Mihiel offensive, Sept. 26, 1918, has already been published. This was read at the presentation, as was, also, an order from the Headquarters of the French armies of the east citing Major Kenneth Marr for the Croix de Guerre and describing him as an "excellent squadron commander of a legendary bravery, who has been a beautiful example for his entire unit."

A subsequent feature of the program was a presentation of medals to the Boy Scouts of Coronado.

Rockwell Field lays not a little of the credit for the success of the day to the work of the nine bands that played continuously. These bands were from the Balboa Park Naval Training Station. Camp Kearny (three bands), Rockwell Field Naval Air Station, Fort Rosecrans, and the Section Naval Base.

Distinguished Visitors

Among the distinguished visitors at the circus, as guests of Lt. Colonel Burwell, were Major Gen. Guy Carleton, commanding Camp Kearny; Rear Admiral William Fullam, commander of the reserve force, Pacific fleet; Glenn Martin, vice-president of the Glenn Martin Aircraft Corp.; Col. Henry H. Arnold; Lt. Commander E. W. Spencer, commander of the naval air school, North Island; Brig. Gen. W. C. Short; Col. Guy Rowe; Col. J. R. Pourie, commander of the seacoast defenses of San Diego; Capt. Arthur MacArthur, commander of the naval training camp, Balboa Park. Most of these officers were accompanied by their wives; and Mrs. Newton Baker, wife of the Secretary of War, and Mrs. William L. Kenly, wife of the Director of Military Aeronautics, were also guests of the commander.

The net profit of the circus was set down as $4,742. This is to be devoted to the Rockwell Field Athletic Fund and to the expenses of the great international exhibition, which it is planned to give at North Island, November 11, 1919—the date set for the annual event.

B. A. Guy and S. S. Bradley, two prominent members of the Manufacturers' Aircraft Association which is conducting the present Exposition

Commended the 64th Balloon Company

Lt. Col. H. B. S. Burwell, J.M.A., Commanding Officer of Rockwell Field. has commended the Commanding Officer, Arcadia Balloon School, on his cooperation in the Rockwell Field Flying Circus, as follows:

AUTHORITY OF A. S. DIRECTOR IS DEFINED

In Supreme Control of Aeronautics as Well as Production

GENERAL ORDERS AMENDED

Announcement Made by the Chief of Staff Under the Direction of the Secretary of War

To enable the Director of Air Service to exercise the necessary supervision, control, and direction over the Bureau of Aircraft Production and the Division of Military Aeronautics, with which he is charged by direction of the Secretary of War, the following was announced by the Chief of Staff:

The Director of Air Service will carry out the duties of the Chief of the Air Service, as prescribed in Article LXXXI, Army Regulations, 1913. He will exercise, under the direction of the Chief of Staff, full and complete supervision, control, and direction over the Bureau of Aircraft Production and the Division of Military Aeronautics, in all that pertains to administration, supply, instruction, training, and discipline.

General Orders, No. 80, War Department, 1918, have been amended by striking out the words "the Directors of Military Aeronautics,—of Aircraft Production," and substituting the words "The Director of Air Service".

Lt. Col. Harvey B. S. Burwell

Lieut. Col. Harvey B. S. Burwell, Commanding Officer, Rockwell Field, was an honor graduate of Norwich University, Northfield, Vermont, class of 1913. He was given his first commission as second lieutenant in the Twelfth U. S. Cavalry on Oct. 5, 1913.

In April, 1914, Lieutenant Burwell was sent to the lower border in the Brownsville district and remained there during the bandit trouble. In 1915 he was transferred to the Thirteenth U. S. cavalry and stationed in Texas, Big Ben District, and on July 21, 1916, he went into Mexico. serving under General Pershing for eight months. His company was the first in and the last out of Mexico, and on Sept. 25, 1915, he was engaged in the famous battle against Della Rosa, the bandit chief.

During this battle thirty-five cavalrymen stood off the bandit forces numbering seven hundred, losing only three men and seven horses.

Lieut. Burwell was reported for bravery under fire for his action in this battle. He was made quartermaster of the first squadron, Thirteenth cavalry, during his stay in Mexico.

In December, 1916, Lieutenant Burwell was transferred to Rockwell Field for flying instruction and was made first lieutenant and commanding officer of the First Aero Squadron, which consisted of five hundred and fifty men. The lieutenant was promoted to captain in June, 1917, and transferred to the artillery.

On July 7, 1917, he received his J. M. A. with grade of major.

Major Burwell was officer in charge of flying at Kelly Field for several months, going from that post to Fort Worth and serving two months with the British Royal Flying Corps and incidentally taking a course in gunnery.

Later he went to Ellington Field to witness the training of gunnery instructors, also taking a course in bombing.

Major Burwell was made Commanding Officer of Rockwell Field June 10, 1918.

Major Burwell was commissioned a lieutenant colonel on Aug. 24, 1918, and as Commanding Officer of America's foremost flying school, has established an enviable record. In addition to conducting the post with thorough military efficiency, he has won the admiration and co-operation of the commissioned and enlisted personnel by close personal association and development of recreative interest. He used his football experience to a high degree of success in turning out a championship military football team.

Lt. Col. Harvey B. S. Burwell
Commanding Officer, Rockwell Field

SEEKING THE IDEAL MAIL AIRPLANE

Questionnaire Sent to All Postal Pilots by Otto Praeger

GENERAL SPECIFICATIONS

Answers Required Within Ten Days from Date of the Receipt of the Letter from the Post Office Department

Second Assistant Postmaster-General Otto Praeger has sent the following self-explanatory letter and questionnaire to all pilots in the Air Mail Service.

LETTER

Attached herewith is a questionnaire drawn up to cover the general outline of an ideal mail airplane. These questions have been compiled from a complete list of "General Requirements for Mail Airplanes," prepared by the Post Office Department.

It is requested that you answer the questions on another sheet, in the order in which they are placed. Your personal ideas will be invaluable to all concerned.

Return your answers promptly to the Division of Aerial Mail, not later than ten days after receipt.

QUESTIONNAIRE

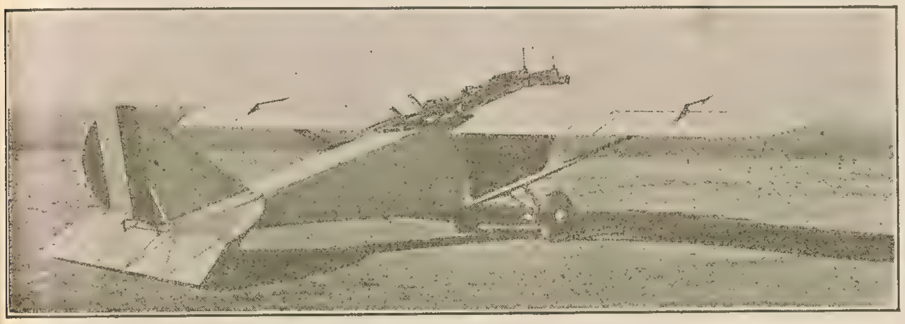
To all Pilots, Aerial Mail Service—Requirements for Ideal Mail Ship

It is requested that you fill out the following question forms, the purpose of which is to aid the Post Office Department in the development of a commercial type ship, suitable for schedule flying. You are asked to place your answers on another sheet with the proper number and letter designation

1. General Specifications
   a. How many motors?
   b. Mailing load in pounds at 17½ lbs. per cu. ft.?
   c. Should a pilot-mechanic be carried?
   d. Do you think wings should hinge on large ship for storage purposes, and how?
   e. Give general factor of safety.
   f. At what altitude should ship be balanced?
2. Performance (Normal Load)
   a. What should cruising speed be, and at what altitude measured?
   b. Minimum buoyancy speed?
   c. Cruising radius?
   d. Have you an idea for slow landing device, either inherent or mechanical; if so, what?
   e. What should climb of 6000 ft. be, and what service ceiling?
   f. What percentage of normal maximum power should keep a ship at an even altitude?

Ship by Units

1. Motors
   a. Where should motor or motors be located?
   b. Should each be independent?
   c. Should they be accessible during flight, and how?
   d. Do you recommend motor starters? What type?
   e. Should radiators have complete shutters?
2. Fuselage
   a. How would you distribute landing gear stresses?
   b. How and where would you place leads?
   c. Have you any suggestions for carrying mail?
   d. Would you alter present type of tail skid? How?
   e. Should skid be steerable from rudder bar?
3. Wings
   a. State ideas for wing construction.
   b. What factor of safety.
   c. Have you any changes to suggest in wing skids?
   d. What wing loading do you think advisable?
4. Landing Gear
   a. Give desirable factor of safety.
   b. Where placed?
   c. Do you think three strut landing gear advisable?
5. Controls and Control Surfaces
   a. "Dep" or stick?
   b. Should controls be accessible in flight?
   c. Should all control surfaces be balanced?
   d. Do you think stabilizer should be hinged?
6. Gas and Oil
   a. Should each motor have independent gas and oil?
   b. What feed system should be used?
   c. Do you recommend accessibility for all valves and leads during flight? How placed?
   d. How should gas and oil tanks be anchored and where placed?
   e. How would you provide loads against vibration?
7. Safety and Comfort of Crew
   a. Should pilot and mechanic, if any, be placed before or behind the main lead?
   b. Should cock-pit be enclosed or open?
   c. How should cock-pit be heated for winter flying?
   d. Should there be passageway through fuselage to vital parts?
   e. State in detail your ideas for location of controls, instruments, seats and the amount of room available in cock-pit.
   f. Can you suggest an adequate fire extinguisher system?



The Record-Breaking Loening Monoplane

Reserve Military Aviators

The following officers have been rated Reserve Military Aviators: Second Lieutenants James B. D. Palmer, A.S.A., and Harvey Ashfield, A.S.A., to date from January 30, 1919; and Second Lieutenant Walter William Roop, A.S.A., to date from January 13, 1919.

Military Aeronautics Strength and Reduction of Personnel

Figures prepared by the General Staff, show that 60 per cent of the total personnel of the Division of Military Aeronautics was overseas on February 6.

Distribution of personnel in United States and overseas at various dates is shown in the following table:

	Number		Per Cent	
Date.	In U. S.	Overseas.	In U. S.	Overseas.
Nov. 11	79,321	78,786	50	50
Nov. 18	80,689	78,973	51	49
Nov. 25	84,785	78,361	52	48
Dec. 2	84,844	78,061	52	48
Dec. 9	889,661	70,040	56	44
Dec. 21	81,607	61,245	57	43
Dec. 26	77,140	59,917	56	44
Jan. 6	67,833	59,584	53	47
Jan. 16	51,821	58,854	47	53
Jan. 23	46,467	58,133	44	56
Jan. 30	41,314	57,527	42	58
Feb. 6	37,537	56,299	40	60

The War Department recently announced that the Air Service personnel in Washington had decreased as follows:

Division.	Civilian Personnel, Nov. 11.	Net reduction, Nov. 11-Feb. 7.	Per cent decrease. Nov. 11-Feb. 7.
Aircraft Production	1,861	579	31
Military Aeronautics	1,100	313	28
The total figures for whole War Department are	25,892	6,536	25

42 De Havilland 4 Planes Remaining on Order

Deliveries of De Havilland 4 planes during the week ended February 7 were 5, leaving 42 still on order. A total of 4,600, exclusive of 204 shipped without engines, have been produced.

The status of contracts on February 7 is shown below:

	Balance on order Nov. 11.	Suspended Nov. 11 to Feb. 7.	Delivered Nov. 11 to Feb. 7.	Per cent		
				Suspended.	Delivered.	Remaining.
Standard Airc. Corp.	421	360	61	86	14	..
Fisher Body Corp.	3,031	2,400	631	79	21	..
Dayton-Wright Air. Co.	2,623	1,900	681	72	26	2
Total	6,075	4,660	1,373	77	22	1

BRITISH ARE MAPPING OUT AIR ROUTES

Plans Laid for a Line Between Cairo and Australia

TRANSFER OF GOLD HINTED

At Work Establishing Air Postal Lines Between England and France and Between Boulogne and Cologne

"Preparations must be made for the day when all-British air routes will play a great part in the maintenance of the commercial existence of the British Empire," said Major Gen. Sir Frederic H. Sykes, Controller General of Civil Aviation, in an address before members of the Australian and New Zealand luncheon club recently.

He said that the British Government had for some time been engaged in mapping out stages on an air route from Cairo to Australia by way of Karachi, Singapore, and the Sunda Islands.

The establishment of postal service by airplane is a practical proposition, he said, and it is one the dominions will undoubtedly have in hand at an early date. Statistics show that for ten years before the war an average of £3,000,000 in gold was annually sent to the United Kingdom by Australia. I leave it to you men of business to estimate the enormous gain that would be secured if this bullion could be transferred and put into circulation in, say, ten days instead of sixty.

Sir Frederic outlined the work that is being done in establishing aerial postal routes between England and France and between Boulogne and Cologne, where British troops are located. At present a letter is five days in transit between London and Cologne, and the speaker said that this time could be reduced to seven hours. He said a regular timetable was being made out, landing stages were being built, and detailed preparations for the service were making progress.

Flying Boat Hangar at 181st Street, N. R.

A new venture in aviation is announced by Henry Amerman, attorney for a group of men headed by I. M. Uppercu, president of the Aero-Marine Plane and Motor Co. It is proposed to build a public flying boat service station at 181st street and the Hudson River (Fort Washington Point).

Mr. Amerman stated that the venture is being projected merely to encourage water flying and the private ownership of air yachts. The station will be a hangar only. There is no intention of participation in passenger-carrying lines or anything of that nature other than to sell 'planes and rent hangars.

First Flight Over the Grand Canyon

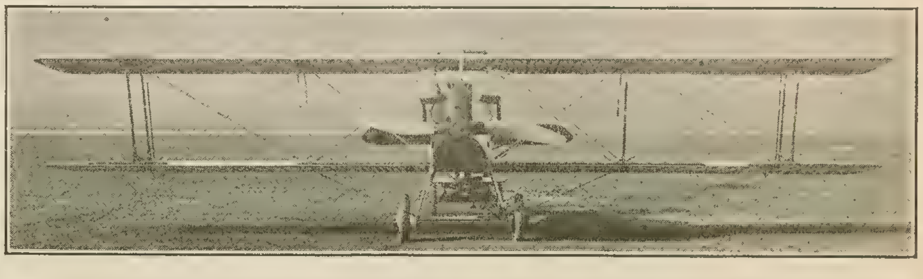
What was said to have been the first airplane flight over the Grand Canyon of Colorado was made Feb. 24 by Lieuts. R. O. Searles and E. D. Jones. They used a De Haviland plane and were in the air two hours.

Flew at the Rate of 168 Miles an Hour

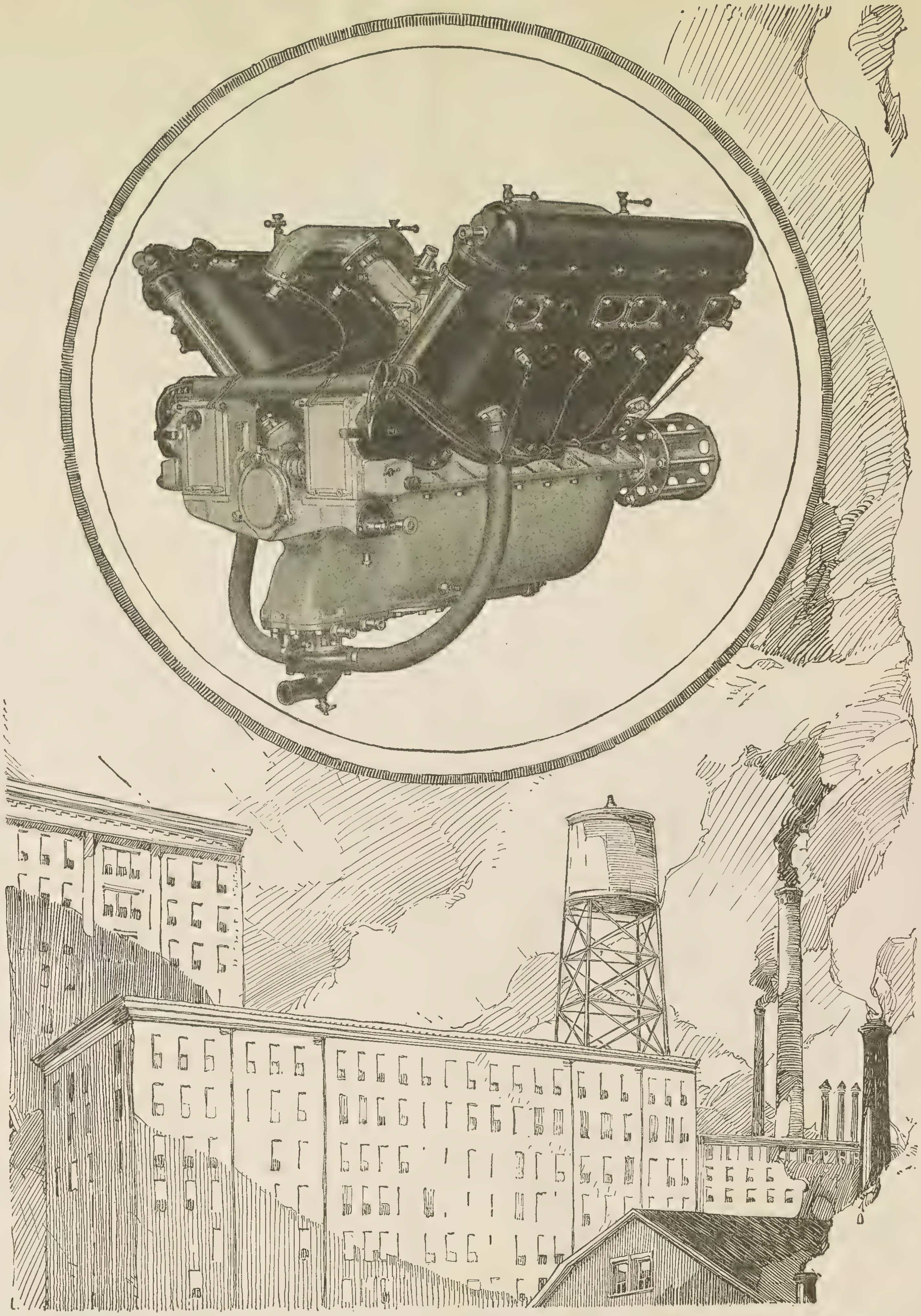
Sustained speed such as never before was reached by man in air, water or on land was achieved Feb. 19 by Lieut. Ernest E. Harmon of the Air Service when he made a trip between Mineola, L. I., and Bolling Field, Washington, in 1 hour and 25 minutes. His average for the distance, of about 235 miles, was 168 miles an hour.

The record was made in one of the new La Pere scout planes, designed by a French officer for American sky fighters. A 400-hp. Liberty motor furnished the power which shot the little plane through the air at the rate of 246 feet a second.

The previous record between New York and Washington was 1 hour and 37 minutes, established by Major Ocker in January, when he flew to New York with Major-Gen. W. L. Kenly in a De Haviland-4.



The La Pere Scout Plane Powered by a 400 Hp. Liberty Engine



AMERICAN Industry offers no finer example of efficiency than that behind the intensive production of the

HISPANO-SUIZA AIRCRAFT ENGINE

"The Motor that made the Spad possible"

for the war-time equipment of thousands of combat, pursuit and training 'planes, hydro's and dirigibles in the United States Government Air Program.

Manufactured by

Wright-Martin Aircraft Corporation
New Brunswick, N. J.

SECTIONS 4 and 5
MADISON SQUARE GARDEN
MARCH 1st to 15th

ARMY AND NAVY AIR SERVICE ASSOCIATION

Steps Taken to Provide a Club House in Washington

NAVY MEN ON THE BOARD

Addresses by Majors James Meissner and Melvin A. Hall, Who Spoke on Air Observation Work

The National Capital will be the headquarters of the Army and Navy Air Service Association, the new name of the Air Service Clubs' Association.

Steps are being taken toward the erection of a building in memory of the Officers of the Air Service, according to an announcement read at a meeting of the Association on February 15.

Col. M. F. Davis, Executive Officer of the Army Air Service, acting as President of the Association in the absence of Major Gen. W. L. Kenly, explained that the National Aeronautic Committee, through its chairman, Mrs. Charles Van Rensselaer, had written the President of the Association offering to present the Air Service Association with the memorial building to American Aviators, as the National headquarters.

Function of the Association

One of the principal functions of the Association is to bring Air Service officers closer together for the good of the air service and aeronautics in general. The building will be in the form of a club house for officers of the Air Service of both the Army and Navy, either active or discharged, where the best things they have learned in the service of their country can be encouraged and perpetuated.

The announcement concerning the club house came as a surprise to the members of the Association who met primarily to change the name from "Air Service Clubs' Association" to the "Army and Navy Air Service Association" in honor of the many new members from the Navy and Marine Corps flying branches. Commander John H. Towers, U.S.N., a pioneer flier, was elected a member of the Board of Control of the Association. Lt. Col. J. E. Fickel, A.S.A., was elected Treasurer; Capt. Earl N. Findley, Secretary, and Lieut. Carl H. Butman, Asst. Secretary.

Preceding the business meeting, Major James A. Meissner, of Brooklyn, one of America's recently returned "Aces," addressed the meeting and related some of his experiences in France. His remarks were accompanied by moving pictures of aviation activities taken by the Signal Corps and lent the Association by the War College.

Air Observation

Following the business of the meeting Major Melvin A. Hall, A.S.A., who formerly flew with the British and was recently Chief of the Aviation Forces of the First American Army Corps, spoke briefly on a little known branch of the aerial observation work. He cited some interesting feats performed by the low-flying contact planes in co-operation with infantry advances maintained principally by dropping notes from overhead. He told of one pair of fliers who, after flying in advance of troops indicating and attacking machine-gun nests hidden from the infantry, were forced to land. The pilot and observer immediately got in touch with the commander of the advancing troops and led them around the machine-gun nests safely, eliminating casualties and eventually capturing the nests.

Among those present were Maj. Gen. Charles T. Menoher, Director of the Air Service, Cols. M. F. Davis, W. E. Gillmore, G. H. Crabtree, A. L. Fuller and Lt. Col. B. F. Castle, and O. Westover.

The Association now numbers 1,150 members and has on deposit over $8,000.

All of the Air Services May Be Combined in One Department

In the Army appropriation bill, which has been recommended unanimously by the Senate Military Affairs Committee, and is now up for passage, there is created a Department of Aeronautics which will include Army, Navy and Marine Corps Air Services. It is the most important piece of legislation of the session so far as the air services are concerned. The section reads:

Department of Aeronautics

That there is hereby created for the period of the present war and for one year thereafter an executive department in the Government of the United States to be known as the Department of Aeronautics, the head of which shall be designated the Director of Aeronautics, who shall be appointed by the President, by and with the advice and consent of the Senate, who shall receive a salary of $12,000 per annum. The Director of Aeronautics shall have direct and complete control of all matters pertaining to the designing, purchase, manufacture, production, and operation of aircraft and aircraft equipment intended for the use of the Army, the Navy, and the Marine Corps of the United States.

That there shall be in said department an Assistant Director, to be appointed by the President, by and with the advice and consent of the Senate, who shall receive a salary of $5,000 per annum. The director shall appoint such other officers and employees as may be found necessary for the proper and efficient transaction of the business of the department.

That the unexpended balance of such appropriations as may have hitherto been made for the purchase and manufacture of aircraft and aircraft equipment and all appropriations which may hereafter be made for such purpose shall be available for the purposes of the department.

That the President is hereby authorized to establish the necessary subordinate bureaus for the conduct of the operation of the Department of Aeronautics and to transfer to said department such functions, powers, and duties now vested by law in other departments of the Government pertaining to the air service and such personnel, commissioned, enlisted, and civilian, as may be necessary for its operation.

The President is further authorized to transfer from the appropriations for pay, subsistence, and maintenance of the Army and Navy sufficient funds to provide for the pay, subsistence, and all other requirements of the officers, enlisted men, and civilian employees of the Department of Aeronautics, except such as have been otherwise provided for at the same rates as have been heretofore paid in the sveral commissiond, enlisted, and civilian grades.

Appropriations, Air Service: Creating, maintaining, and operating at established flying schools, course of instruction for aviation students, including cost of equipment, and supplies necessary for instruction and subsistence of students, purchase of tools, equipment, materials, machines, textbooks, books of reference, scientific and professional papers, printing and binding such papers for use of schools, and instruments and material for theoretical and practical instruction at aviation schools; purchase of supplies for securing, developing, printing, and reproducing photographs made by aerial observers; to maintain and replace the equipment of organizations already in service; enlargement, equipment, maintenance, and operation of aviation stations, balloon schools, fields for testing and experimental work, including the acquisition of land, or any interest in land by purchase or lease, or condemnation where necessary to procure Helium gas; procuring and introducing water, electric light and power, telephones, telegraphs, and sewerage, including maintenance, operation, and repair of such utilities; purchase of stoves and other cooking and heating apparatus, kitchen and table ware, and furniture and equipment for kitchens, mess halls, officers' quarters, barracks, hospitals, and other buildings; screens, lockers, refrigerators, and all other equipment; salaries and wages of civilian employees in the District of Columbia or elsewhere as may be necessary; payment of their traveling and other necessary expenses; actual and necessary expenses of officers and enlisted men and civilian employees of the Department of Aeronautics and authorized agents sent on special duty at home or abroad for aviation purposes, including observation and investigation of foreign military operations and organizations; experimental investigation and purchase and development of new types of aircraft, accessories thereto, including Helium gas rights, and aviation engines, including patents and accessories; purchase, manufacture, maintenance, repair, storage, and operation of airships, war balloons, and other aerial machines, including instruments, gas plants, hangars and repair shops, and appliances of every sort and description necessary for the operation, construction, or equipment of all types of aircraft, and all necessary spare parts and equipment connected therewith; and also for the purchase or manufacture and the issue of special clothing, wearing apparel, and similar equipment for aviation purposes, $30,000,000: Provided, That claims not exceeding $250 in amount for damages to persons and private property, resulting from the operation of aircraft at home and abroad, may be settled out of the funds appropriated hereunder, when each claim is substantiated by a survey report of a board of officers appointed by the commanding officer of the nearest aviation post, and approved by the Director of Aeronautics: Provided further, That claims so settled and paid from the sum hereby appropriated shall not exceed in the aggregate the sum of $150,000.

Air Line Distances From Souther Field

Following are the unofficial air line distances from Souther Field, Americus, Ga., to Albany, N. Y., 1092 miles; Atlanta, 113; Augusta, 157; Birmingham, 183; Boston, 1207; Buffalo, 977; Charleston, 245; Chattanooga, 216; Chicago, 835; Cincinnati, 595; Cleveland, 776; Columbia, 220; Dallas, 889; Denver, 1380; Galveston, 791; Havana, 648; Houston, 819; Jacksonville, 187; Kansas City, 906; Key West, 558; Little Rock, 515; Los Angeles, 2372; Louisville, 502; Macon, 61; Memphis, 460; Miami, 521; Mobile, 243; Montgomery, 146; Nashville, 318; New Orleans, 416; New York, 982; Omaha, 1380; Philadelphia, 900; Richmond, 567; St. Louis, 581; San Antonio, 1049; Savannah, 174; Tampa, 307, and Washington, 752.

FINDING NEW USES FOR AIRPLANES

Capable of Development in the Realm of Life Saving

MACHINES FOR COAST GUARD

Fishing Fleets Considering Their Utility in Tracking Schools of Mackerel or Herring

While air experts in England as well as in America and other countries are uses of aircraft in the near future, it is believed by many enthusiasts in Britain that air navigation will derive great good from the international Peace Conference.

It is now seen that, aside from the economic uses of aircraft, there is a possibility of great developments in connection with life saving. The opinion was expressed recently that the heavy toll of death from yachting disasters may be quicky reduced by seaplane or airplane patrols during the summer months, for, except in cases of severe storm, it would be possible to pick up survivors by means of seaplanes or save many lives by quick notification to the coast guards.

Useful in Aiding Wrecks

It is argued that even in case of shipwrecks such patrols would be of the greatest aid in giving the positions of wrecks, unless a hurricane was blowing.

To do this it would be necessary to equip certain coast guard stations with aircraft.

Another suggestion is that lighthouse keepers in isolated places need no longer be dependent for mails on Government tenders caling once in fifteen or thirty days, for in auspicious weather airplanes or seaplanes could drop mail once a week or oftener. It would only be a development of the use to which airplanes were put during the war in dropping messages, food and ammunition to isolated bodies of soldiers.

Humanitarian Air Code

In other words, while striving for economic development of the air service in different countries it is also possible to develop it along humanitarian lines. Sooner or later it will be necessary for an international conference to decide on rules of air, and it is contended that at the same time something should be done to develop a humanitarian air code. America, it is believed here, will enthusiastically consider the humanitarian question.

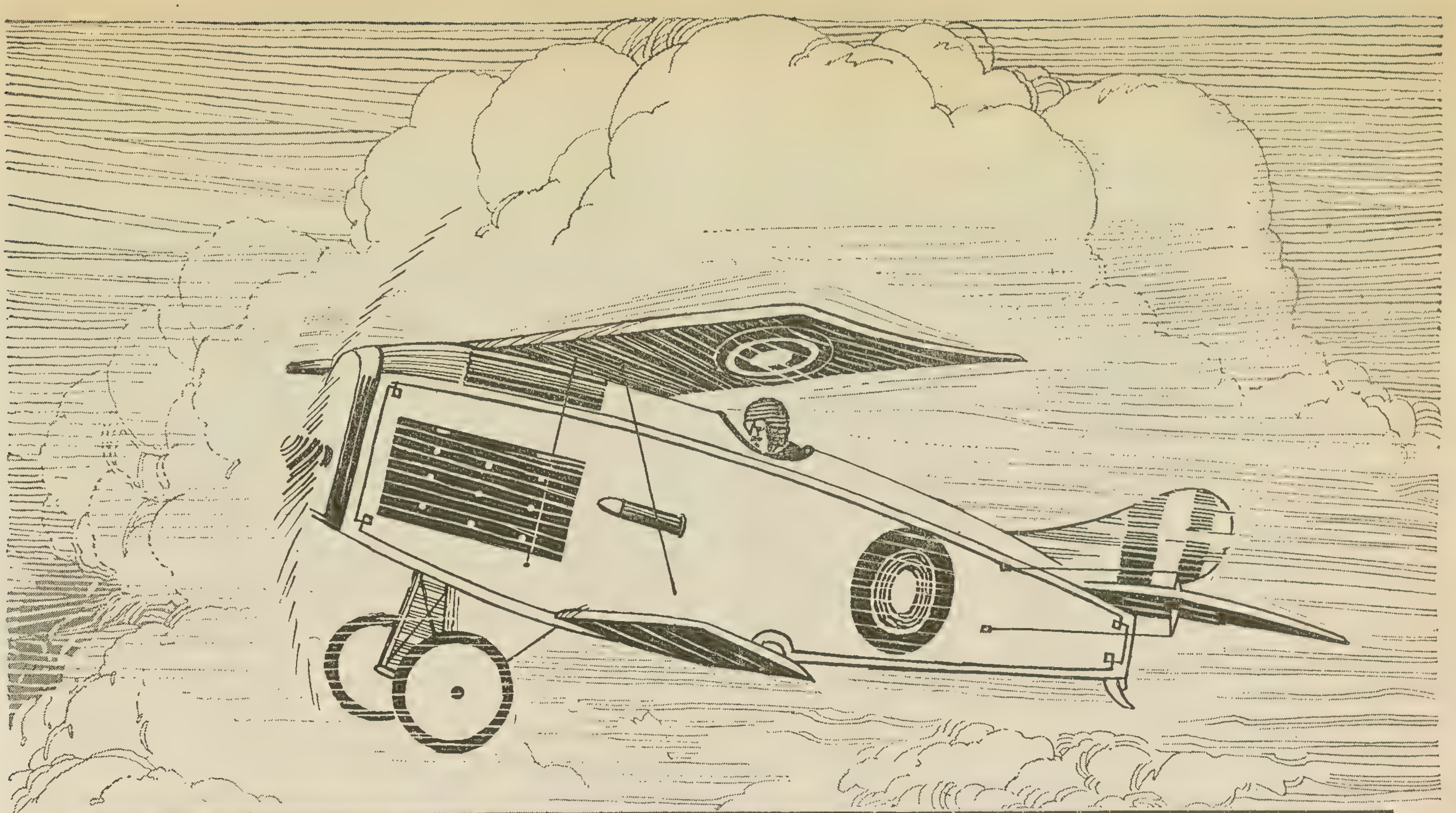
One of the latest suggestions for the economic use of aircraft is that the great fishing fleets are already considering the possibility of tracking schools of mackerel or herring by aerial observation, thereby insuring big hauls of fish and reducing the uncertainty of locating places where fish are running.

Airplane Courier Service for A. E. F.

American officers are endeavoring to arrange for an airplane courier service to connect various military missions at different points in the Central Empires and in new states with the American base in France. Present communications are difficult and unsatisfactory, particularly with Prague and Warsaw.

New York Police Aviation School

New York's Police Reserve Aviation School has been placed in charge of Capt. Dinshah P. Ghadiali by Special Deputy Police Commissioner Rodman Wanamaker. It is strictly a volunteer institution, and the instruction is without charge. The city will furnish a building for the work.



The Christmas "Bullet"—
Valsparred, of course!

The Christmas "Bullet," is a business-like looking machine, designed by Dr. William Whitney Christmas. It is the first "strutless" biplane The wings are flexible and during flight they bow, giving them the appearance of bird's wings.

Equipped with a Liberty Six, which is rated 185 h. p., a speed of 197 miles per hour was made by this plane at Government Experimental Field No. 1 (near Central Park, L. I.) on December 3rd and 7th, before Col. Harmon and his staff.

Naturally, Valspar was used on the varnished portions of this plane. No other varnish made is elastic enough to stand the terrific vibration of this machine, whiz-z-z-ing through the air at 170 miles an hour.

Valspar resists *all* of the destructive effects of high speed and hard usage in airplane service and retains its protective qualities long after ordinary varnish requires renewal.

In constant use in the air service of the Allies during the war, Valspar was the one varnish that satisfied *all* of the exacting requirements.

Our Airplane Department will gladly afford information and assistance in solving your varnish problems. To Purchasing Agents and Superintendents of Production: We will send our book on airplane finishing free on request.

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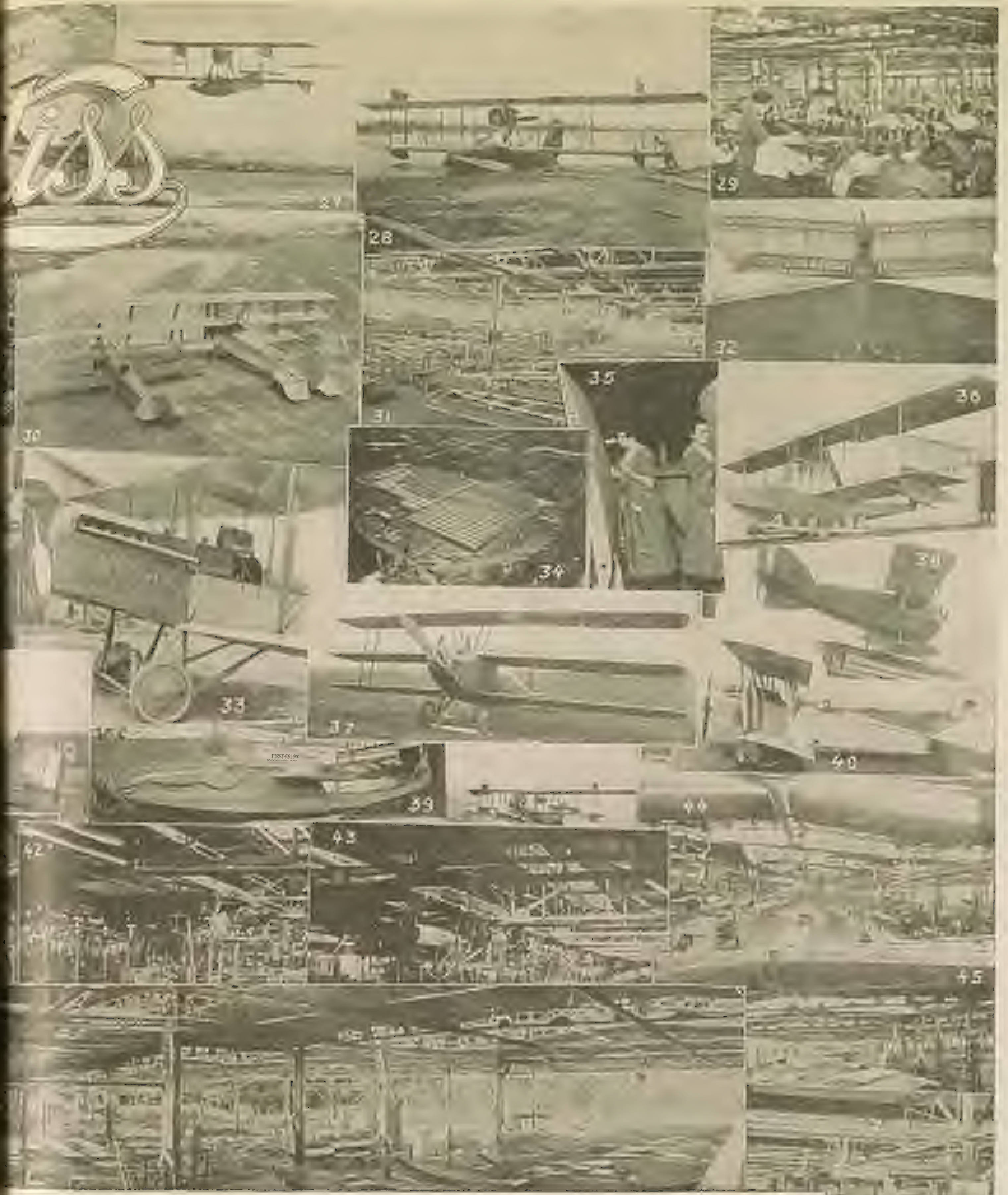
THE INSIDE ST

1. The new Curtiss Model K 12 aeronautical motor.
2. A Curtiss J. N. in flight.
3. The Curtiss Flying Boat built for Rodman Wanamaker.
4. A Curtiss Mailplane.
5. The famous Curtiss J. N. 4D, on which over 98% of all American and Canadian pilots were trained.
6. The Curtiss O. X. motor regarded by experts as the best 90 H. P. aeronautical motor made.
7. The Curtiss Model L Triplane.
8. A Curtiss Triplane Flying Boat.
9. Another view of the Curtiss K, 12 motor — this motor is 25% lighter than any other 400 H. P. motor so far produced.
10. The familiar J. N. profile.
11. The Curtiss Engineering Corporation Plant at Garden City, L. I.
12. The fuselage assembly floor.
13. A recent commercial Curtiss Tractor.
14. A Curtiss twin J. N.
15. A rear view of the Curtiss H. S. 2 flying boat.
16. A Curtiss Triplane military tractor.
17. Three early Curtiss military tractors.
18. The gigantic navy N. C. 1 flying boat, bui Curtiss Engineering Corp., recently flo 51 persons aboard. The largest flying bo world.
19. A modern English type of military tractor
20. A Curtiss Triplane Hydro.
21-22. Building flying boat hulls for the navy
23. A view on the assembly floor at one of the plants.
24. Another one of the Buffalo assembly floors

CURTISS AEROPLANE & MOTOR CORPORATION,

Factories and Flying Fields: Buffalo Hammondsport, N. Y. Newport News, Va. Miami, Fla



F THE CURTISS

oramic photograph of the general assembly
f the six Curtiss Buffalo plants.
tor assembly at Hammondsport.
rtiss F boat.
Curtiss H. S. flying boat.
of the thousands of women employed in
plants
iplanes.
mbly floor—Fuselages.
eleton of the Curtiss J. N. showing construc-
on.

33. The Curtiss R 4 Mailplane.
34. An aeroplane photo of the Buffalo North Elmwood plant just before completion.
35. Girls sewing wing
36. The new Curtiss M. F. flying boat.
37. The fastest aeroplane in the world. The Curtiss type 18, credited in government reports with 160 miles per hour, with full military load of 1100 pounds.
38. The most efficient Hydro in the world.
39. The first hull of the FSL flying boat.
40. The Curtiss J. N. 4 D.
41. The Curtiss H 12 flying boat.
42-45. Various departments in the Buffalo plants of the Curtiss.
46. A general view of one of the Curtiss metal working shops.

SEE OUR EXHIBIT AT AERONAUTICAL EXPOSITION AT MADISON SQUARE GARDEN, N.Y. MARCH 1st TO 15th.

ffice: 52 Vanderbilt Avenue, New York City

URTISS ENGINEERING CORP., Garden City, L. I. THE BURGESS CO., Marblehead, Mass.

Fliers Honored at Aero Club Dinner

Fifty-three American fliers were honored at the thirteenth annual banquet of the Aero Club of America in the Waldorf-Astoria February 19.

Captain Edward V. Rickenbacker was doubly honored. His name was in the list of Medal of Valor winners. It was also announced that he had won the Clarence H. Mackay trophy offered through the club for aerial army competition.

Contributions to the $250,000 fund being raised for the Roosevelt Aero Arctic Expedition to be commanded by Capt. Robert A. Bartlett were also announced by Mr. Hawley. William K. Vanderbilt has given $10,000, Charles H. Sabin has contributed $5,000.

Secretary Baker sent a telegram in praise of the air service. So did Gen. Pershing, Rear Admiral Robert E. Peary, Major Gen. Leonard Wood, Major Gen. W. L. Kenly, Ambassador Sharp in Paris and Walter Wright. At the tables were army, navy, Marine Corps and Allied aeronautical authorities and aces.

Ambassador Sharp announced the sailing for the United States on March 8 of a French Government aeronautical mission of fifteen officers, headed by Capt. Lavergne, and bringing the latest model machines for competitive flights. The mission is to visit all large American cities in squadron flights, the message said. Three aces are in the party .

Among the speakers were Maj. Gen. Charles T. Menoher, John Hays Hammond and Capt. Rickenbacker.

Two minutes of applause greeted a message from Gen. Wood that "we must never again be caught unprepared in the air."

Capt. Augustin Lahoulle, sent by the French Government with Lieut. Georges Flachaire to represent that nation's aces, spoke in his native tongue. He has the Croix de Guerre and was the first French aviator to win the Legion of Honor decoration. He is credited with thirteen balloons and five planes. Capt. Lahoulle took the place of Capt. Rene Fonck, leading French ace, who could not come. The two arrived yesterday on *La Touraine.*

"It is in my heart to say to you how much we of the French Republic appreciate the great work done by your air fighters," Capt. Lahoulle said. "They were the bravest of men, every one of them."

The aces at the dinner were Major James A. Meissner, Major La Guardia, Lieuts. Pat O'Brien, Granville Pollock, Douglas Campbell, Paul F. Baer, William Erwin and Walter Schalaire.

Gave Prisoner Ride in an Airplane

Dayton, O., police are believed to have set a precedent by flying to Indianapolis and returning with a prisoner, Robert T. Tamplin, accused of embezzling. The flight to the Hoosier capital was made in less than an hour. Police Inspector Yendes made the trip with Pilot Harry Whalon.

Handley Page Bomber at Souther

The huge Handley Page Bomber landed gently at Souther Field at 3.28 P. M., February 19, having made the flight from Columbia, S. C., in three hours, a distance of 227 miles. The ship has a capacity of twenty-one men, but carried four officers and seven mechanics. Officers are Captain William S. Reyburn, Lt. G. M. Palmer, Lt. G. L. Bradford and Captain C. F. Clevette. Ship is en route from Elizabeth, N. J., to Ellington Field, Houston, Texas, where it will be used in government work. This is the initial trip of the ship. Today it was piloted by Lt. Palmer. The fliers proceed from here to Payne Field, Miss., then Gernstner Field, La., and the last leg of the flight will be Houston, Texas.

AVIATION
After the War

A most important and exhaustive document on the PEACE-TIME USES OF AIRCRAFT, PROPOSED LEGISLATION AND REGULATIONS has just been issued by the

BRITISH PARLIAMENTARY COMMITTEE
on
CIVIL AERIAL TRANSPORT

This report covers a period of intensive study by the most eminent authorities in England during the past twenty months.

As only a very limited number of copies of the original report were printed and no more can be obtained in this country, the Manufacturers Aircraft Association, Inc., has reprinted the complete report (83 pages of text) in attractive pamphlet form, size 13 x 8⅜.

Price Fifty Cents

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During the war 95% of Zenith production went to supply Zenith Carburetors to the Government. These were used on airplanes, on trucks, on gasoline locomotives, on balloon hoists, on lighting outfits, etc. *Wherever reliability, economy and efficiency were needed Zenith Carburetors were found.*

Zenith Carburetor Company, Detroit

(There are two Zenith Liberty Carburetors used on every Liberty Aircraft Engine produced—the reason is clear to Zenith users.)

MR. WILSON APPROVES AIR REGULATION

Would Place Licensing Under the Department of Commerce

SUGGESTED BY THE N. A. C.

Possible Complications Which Might Arise from Absence of Rules to Govern Civilian Operation

President Wilson, in submitting to the House, Feb. 26, recommendations of the National Advisory Committee for Aeronautics for legislation placing the licensing and regulation of aerial navigation in charge of the Department of Commerce, declared that he "fully approved the suggested legislation." Secretaries Baker, Daniels, and Redfield also indorsed the proposal.

The legislation would give the Department of Commerce authority to issue licenses for civilian operation of aircraft and provides an appropriation of $25,000 for the necessary expenses.

A letter from C. D. Walcott, Chairman of the Executive Committee, said the legislation should be passed at the present session. Mr. Walcott, pointing out the absence of any Federal authority for establishing rules and regulations governing civilian operation, said if the War Department sold its sulplus machines many amateurs would attempt flying, which would result in many accidents. Operation of "unlicensed and irresponsible aircraft," he added, would cause probably complications through smuggling from Mexico and Canada.

Licenses Issued to Fly Civilian Aircraft in 1919 Up to and Including February 24

License No.	Issued to	Address.
117 Renewed	The Lawrence Sperry Aircraft Co	Farmingdale, L. I.
176 Renewed	Dewey Airplane Company	Dewey, Oklahoma
301	Marjorie Stinson	122 King Ave., San Antonio, Tex.
302	Theodore Hedlund	Boston, Mass.
303	Louis Gertson	Chicago, Ill.
304	Baxter H. Adams	Henderson, Ky.
305	David Gregg	Brookline, Mass.
306	Edwin K. Jaquith	Atlantic City, N. J.
307	Curtiss Flying Station	Atlantic City, N. J.
308	Walter Pack	San Francisco, Cal.
309	Leon Richardson	Washington, D. C.
310	W. H. Fitzpatrick, Jr	Buffalo, N. Y.
311	Walter T. Varney	San Francisco, Cal.
312	Clarke C. Minter	Washington, D. C.
313	W. E. Nightingale	Nantasket, Mass.
316	J. Riley	Caro, Mich.
320	Harry B. Crewdson	Chicago, Ill.
321	Warren L. Baker	Providence, R. I.
322	Allen P. Bourden	East Greenwich, R. I.
323	John O'Mara, Jr	Brooklyn, N. Y.
324	Ed. R. Hutchinson	Elmira, N. Y.
326	Curtiss Aeroplane & Motor Corp	New York, N. Y.
327	B. H. Kendrick	Atlantic City, N. J.
328	Prof. Rexford C. Gardiner	Celoron, N. Y.
330	Frank Bonar	Underwood, Iowa
331	Charles T. Mills	La Salle, N. Y.
332	America Trans Oceanic Co. (David H. McCullock)	New York, N. Y.
333	Frank Mills	Essington, Pa.
335	Walter W. Raub	Salem, Ohio
336	A. W. Snyder	Bolling Field, D. C.
337	Howard A. Scholle	New York, N. Y.
338	Melvin W. Hodgdon	Somerville, Mass.

Cancellation of Aircraft Contracts

Aircraft contracts totalling $469,000,000 have been canceled or suspended by the War Department since the signing of the armistice. A department statement said that 53 per cent of the total represented orders for engines and parts and 35 per cent for planes and parts.

During the week ended Feb. 7 about $2,000,000 worth of engines and planes were delivered, leaving orders still to be filled valued at $10,000,000. Outstanding orders for service planes on the day hostilities ceased aggregated $125,000,000 and up to Feb. 7 about $114,000,000, or 91 per cent of these contracts, had been canceled. The outstanding orders on Nov. 11 for service engines was $227,000,000, of which $193,000,000, or 85 per cent, have been canceled.

Permission for Civilian Joy Rides

The Director of Military Aeronautics has announced that civilians will not be permitted to make flights or take joy rides in Army airplanes without authority from the Secretary of War. Paragraph 1586, Army Regulations, provides that:

"Flights in Air Service equipment for other than training or war purposes will be made only upon the express authority of the Chief of Air Service, and no person in the military service is authorized to permit other than the following to be carried as passengers in such equipment: Heads of the executive and judicial branches of the Government, members of the Senate and House of Representatives, officers and enlisted men in the Army, Navy, and Marine Corps, and members and employees of the Air Service."

General Kenly directs that no exceptions will be made to the above regulation by the Division of Military Aeronautics. Civilians who desire to take trips must first get authority from the Secretary of War before presenting themselves to the commanding officers of flying fields or the Division of Military Aeronautics with requests for flights. Applications for flights will not be forwarded to the Secretary of War through the Division of Military Aeronautics.

French Air Mail Starts Today

Aerial mail service between Paris and other important French cities will be inaugurated March 1 by the director of civilian aeronautics.

The fliers will carry mail to and from Paris and Bordeaux, Marseilles, Toulouse, Brest and St. Nazaire.

These lines will be operated by private companies, subsidized by the government.

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—and—

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Aviation Glove

A *double* glove with *double* knitted wool lining; *double* leather, *double* lined pouch for the fingers; thumbs *double* lined with wool and chamois. The warmest, strongest, deftest glove of the kind made. Pouch quickly slipped off or on without taking hand off control. Used by aviators everywhere. Tan or khaki *cape* and grey or khaki *mocha*, $15 a pair.

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Bronze of best quality with safety catch, 60 cents per set; without safety catch, 50 cents per set. Ready for immediate shipment.

The official standard samples on file with the War Department were manufactured by this Company.

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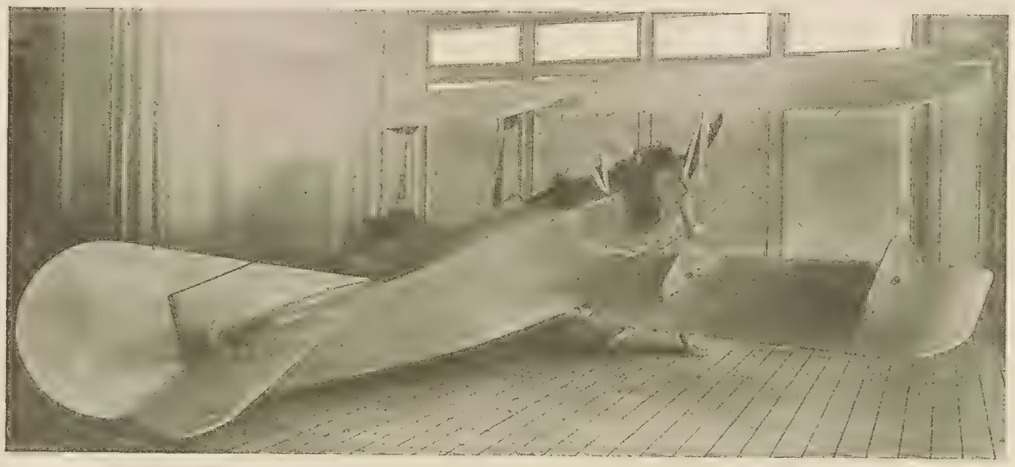

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A RECORD UNEQUALED IN OUR AERONAUTICAL ANNALS

ALL OF THESE PLANES WERE DEVELOPED AND PRODUCED BETWEEN APRIL 4TH 1917 AND NOVEMBER 11TH 1918 —

BY

STANDARD AIRCRAFT CORPORATION

"A REAL FIGHTING INDUSTRY"

Rickenbacker and Others Discharged

America's leading Ace, Captain Edward V. Rickenbacker, A.S.A., who reported at the O.D.M.A., February 10, 1919, was honorably discharged February 13.

The following officers of the Air Service were discharged on the dates noted:

February 10, 1919: Capts. William N. Neidig, Clarence G. Spencer, Laurence E. Rubel, Samuel P. Burnam, Daniel C. McCoy, Robert R. McMath; 1st Lieuts. George H. Pfau, Robert J. Love.

February 13, 1919: Lt. Colonel John A. Drexel, 1st Lieut. Thomas F. Ward, 2d Lieut. Aaron Prussian.

February 14, 1919: Capts. David R. Wheeler, Maury Hill; 2d Lieuts. Harold Palmer, Edwin S. Ladley, Wallace J. Frost.

February 15, 1919: Lt. Col. Thomas G. Gallagher, Major Walter G. Rogers; Capts. Michael J. Phillips, John McQuerney, Otis S. Van De Mark, Charles M. Neubauer; 1st Lieuts. William G. Garrett, Edward E. Dean, 2 Lieuts. Harry A. Van Horn, John M. Saunders; 1st Lieut. Lawrence W. Kinnear.

February 17, 1919: Major Charles S. Jackson; 2d Lieut. Thomas H. Owen.

Mrs. Roosevelt Visits Quentin's Grave

Mrs. Theodore Roosevelt, accompanied by her son, Lieut.-Col. Theodore Roosevelt, Jr., visited the grave of Lieut. Quentin Roosevelt, near Fere-en-Tardenois, Feb. 18, and laid flowers on the simple monument.

Now Comes "Rick" Home

Printed on the dinner cards at the American Automobile Association dinner to Captain Rickenbacker, on Feb. 3, was this very fine tribute from the pen of J. C. Burton:

To you from failing hands we throw
The torch; be yours to hold it high!

Now Rick comes home
  From skies that droned with death—
Machine gun riddled skies
  That made life but a breath
To draw . . . and then expire;
Where Utmost Peril found his heart's desire;
Now Rick comes home.

With skill that knows no peer,
  With heart by daring steeled,
Rick kept his faith with those
  That sleep in Flanders field.
Their torch he bore aloft,
  He snatched it where they lay;
Proud were the buzzards of the Hun
  That fell to earth this eagle's prey.

Now Rick comes home, a hero born of war,
To live while there are eyes to scan
On history's page his name!
But Rick is something more—
A modest, four-square man,
Full worthy of his fame . . .
So Rick comes home.

May Wear the French Fourragers

The Director of Military Aeronautics has just been advised by cable from General Pershing that the 103d Aero Squadron, formerly the Lafayette Escadrille, is one of the two organizations of the A.E.F. entitled to wear Fourragers awarded by the French government. This organization was awarded the Fourragers in the colors of the Croix de Guerre.

Meinkopt Was a Sore Boche

"The sorest man I have ever seen," said an American aviator, "was Lieutenant Meinkopf, the star boche flyer, when he was nipped by Lieutenant Avery, of Columbus. Meinkopf was Baron Richthofen's successor and the best flier that Germany had left.

"When Avery tackled him he abandoned all set principles of air strategy, simply sailed in and opened fire without indulging in preliminary maneuvers. He brought his man down in about three seconds and this was his first boche battle.

"When Meinkopf landed he was purple with rage, and as far as I could make out his main complaint could be translated in this fashion: 'What the hell kind of flying is this, anyhow?'" *The Argonaut.*

Looking at Penn Field Facilities

Lieutenant Colonel Herbert A. Dargue, M.A., A.S.A., was recently ordered to proceed from Washington, D. C., to Post Field, Fort Sill, Oklahoma; thence to Air Service School for Radio Operators, Penn Field, Austin, Texas; thence to School of Military Aeronautics, University of Texas, Austin, Texas, in connection with an investigation of the facilities existing at Penn Field for the establishment of a permanent radio school.

As a preliminary step toward the development of commercial aviation in Canada, the United Aircraft Engineering Corporation, acting for a syndicate, has purchased from the Imperial Munitions Board of Great Britain the entire flying equipment of the Royal Air Force in Canada, with the exception of those few planes which the Dominion is retaining as a nucleus for future Military aeronautical development. The equipment purchased was originally valued at close to ten million dollars.

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Is the latest and highest development in the construction of Landing Gear
Their SIMPLICITY STRENGTH and SERVICE make them the logical equipment for the Modern Airplane.
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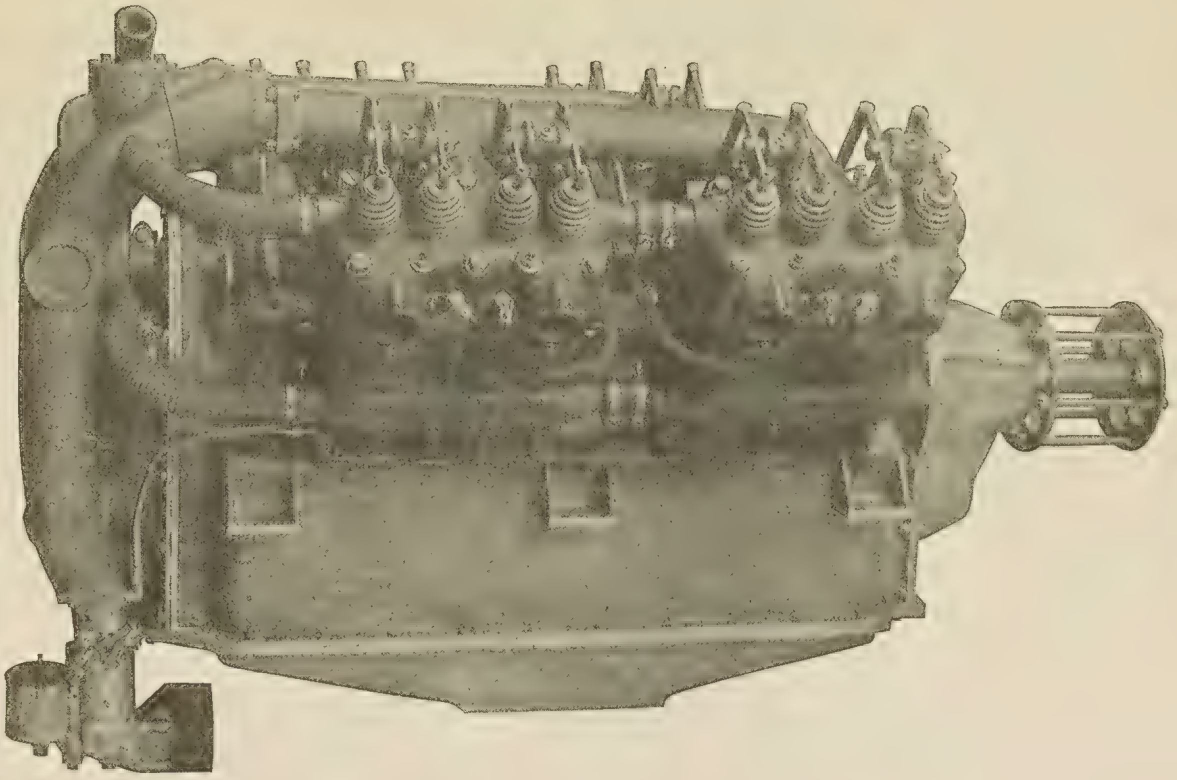

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Type 5A-4½ designed for express service and training work.

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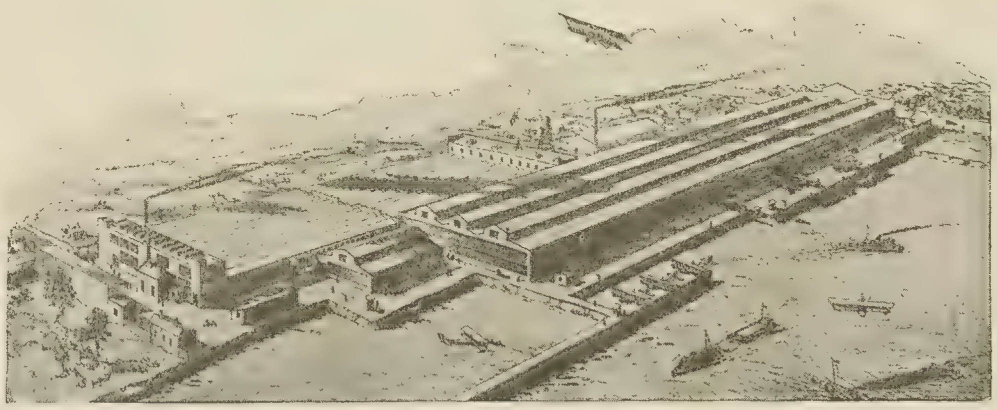

Aircraft Plant at College Point, Long Island

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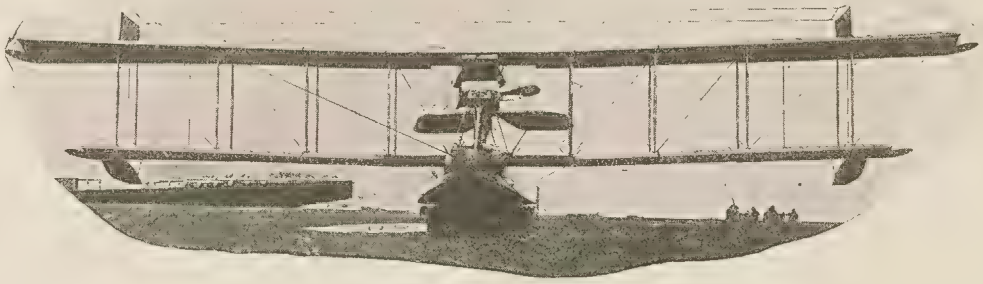
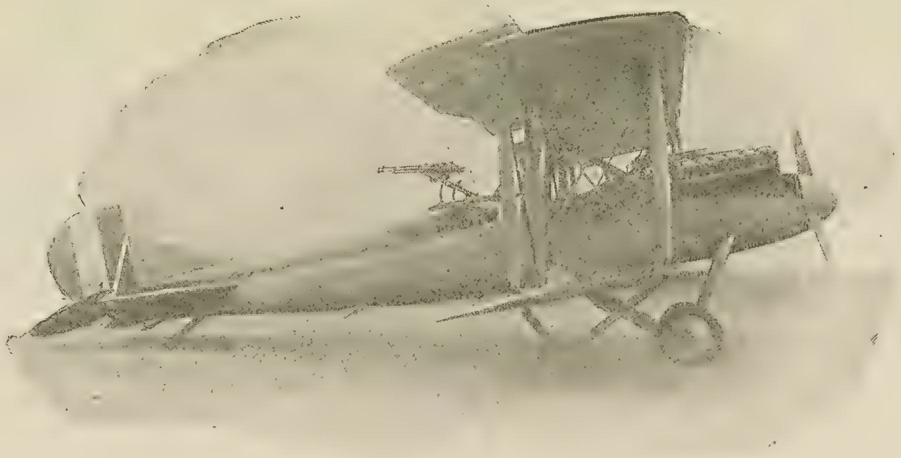


Model VH-1 Seaplane

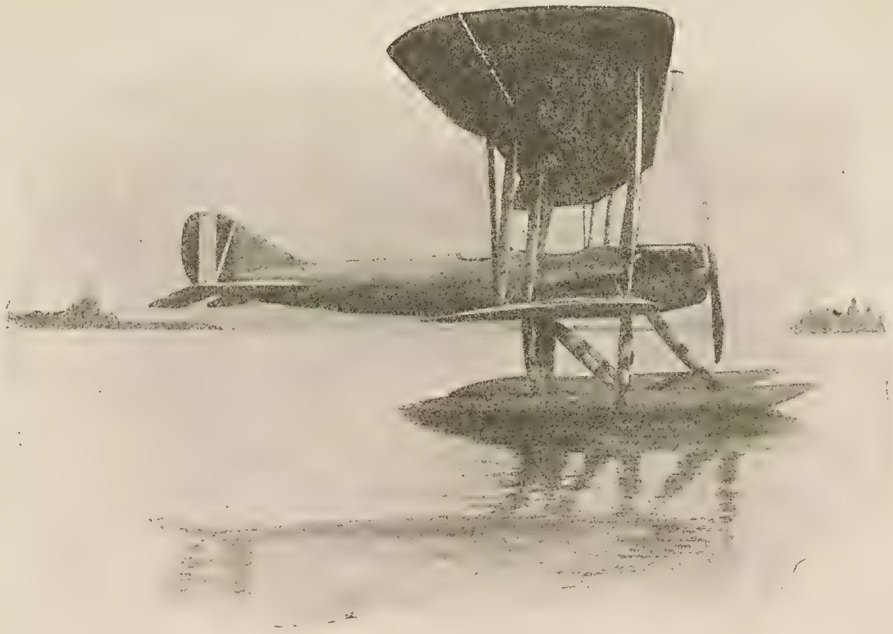
On Exhibition at the Aeronautical Exposition

L·W·F ENGINEERING COMPANY
Inc.
COLLEGE POINT, L. I.



Model G-3 Fighting Bomber

On Exhibition at the Aeronautical Exposition



Flying Boat

On Exhibition at the Aeronautical Exposition

L·W·F ENGINEERING COMPANY
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BRITAIN'S AIR ROUTES OVER THE ATLANTIC

One of Them Is from the West of Ireland to St. Johns

PLAN MASTERY OF THE AIR

Still Maintaining Her Average Annual Output of Airplanes During the Period of War

Great Britain in her plan to fly across the Atlantic to the United States has selected four routes as follows:

1—From Scotland to Greenland, thence to Canada.

2—From the west of Ireland to St. Johns, where the landing place for the giant seaplane that is to make the flight has been selected.

3—from the west of Ireland direct to New York, when the British fleet makes its intended visit to New York, after the signing of the peace treaty, probably in July. The warships will proceed in a long line, with intervals of thirty miles between them, so as to be in position to render every possible assistance to the airplane crossing the ocean.

4—By way of Cornwall, Portugal, the Azores and thence direct to New York.

Plans Mastery of the Air

In her world embracing aerial schemes Great Britain is aiming at the mastery of the skies, to add to her mastery of the seas. Already she leads all other nations in the number of airplanes owned, also in flying personnel and since Germany has disbanded her air fleet, in airships as well.

The transatlantic flight planned by the British Royal Air Force, and similar ventures for which several commercial firms are making preparations are only a small part of the British aerial programme. So far as the Royal Air Force is concerned, the Atlantic flight will be made merely for the purpose of demonstrating the airworthiness and development of British airplanes and not in competition for the $50,000 prize that has been offered.

The Handley Page firm already is packing its huge plane for shipment to America, as it will attempt the flight from the west eastward. It is a four-engined superbomber 1,500 horse-power machine fitted with four Rolls-Royce motors, giving a speed of ninety-five miles an hour on a consumption of sixty-two gallons of petrol an hour.

Maintaining Airplane Output

For this purpose also the general commercial air boards have formed a special meteorological department and already nearly fifty standard observation stations have been erected throughout the British Isles. Weather reports will be exchanged with the international stations of the world.

On the great aerial routes of the world wireless services are being started to give information from every air force observatory. In the immediate future box kites carrying delicate instruments to determine atmospheric conditions will be flown from the sterns of transatlantic liners on various routes between England and the United States.

For commercial purposes air routes from every point in the United Kingdom to every Continental country, Africa, Egypt, the Far East, India and Australia, already are well under course of development. Through her many domains, Great Britain intends to establish air routes all around the world and for this purpose she still is maintaining her average annual output of airplanes in war time, which is between 25,000 and 30,000 machines.

British Airship Up More Than 100 Hours

In the course of a discussion of the Aerial Navigation bill in the House of Commons February 21 Major Gen. John E. B. Seeley, Parliamentary Under Secretary of the Ministry of Munitions, announced that the Government intended to make flying safer by providing a large number of airdromes, some of them military establishments and some civil.

The Government, General Seeley said, would pay the entire cost of the exclusively military airdromes and would start the movement by providing for civil airdromes, but it was hoped that before long the last named would become entirely self-supporting.

A British airship, according to General Seeley, recently remained in the air for more than 100 hours. At an average speed of fifty miles an hour, the Under Secretary added, the airship must have covered more than 5,000 miles. It was possible that the airship could have continued longer in the air, the speaker said, notwithstanding the fact that it encountered considerable wind.

To Record Upper Air Conditions

In a few weeks box kites carrying delicate instruments will be flown from the sterns of Atlantic liners on the various routes between England and the United States. This is to be part of a world-wide plan for recording conditions in the upper air, says the London *Daily Mail.*

The kites are owned by the meteorological section of the British Royal Air Force. They are expected to fly at a great height and to furnish information of incalculable value to prospective transatlantic aerial pilots.

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22 East 17th Street, New York City

WE BELIEVE in the future of aircraft in the United States. As an evidence of this belief we are exhibiting at the Aeronautical Show in New York City two Packard aircraft engines—an eight and a twelve—also a new type of plane designed by Packard engineers.

These products, as yet, are not on the market. Our purpose at this time is to do our part, along with others, in giving to the public a true picture of what the near future has in store. By so doing, we turn into useful channels the results of experience gained in producing planes and engines for war.

Packard Motor Car Company · Detroit

Germany's Big Plane Is Nearly Completed

If the war had lasted a few months longer Germany was prepared to surprise the world with an enormous airplane. The new air giant, planned by Harold Wolff, an engineer, will have its first trial at Doberitz in a few days.

The machine is nearly 166 feet from wing tip to wing tip and stands more than 23 feet high. It has six motors with a total of 1800 horsepower, driving four propellers, two forward and two aft. Each propeller has four blades. Two of the motors, it is said, can stop simultaneously without affecting any of the propellers or having any result except to reduce the speed of the airplane.

Devices on the plane enables the pilots to know at all times their altitude and angle of elevation, and also to tell the absolute as well as relative direction of flying, which, it is believed, will make flying possible on the darkest night and in the thickest fog. The device for determining the absolute direction consists of an instrument adapted to receiving messages from various wireless stations and capable of such adjustment that a message from any particular station can be heard only when the device is turned in that direction.

Space Saved in Packing Airplanes

The studies carried on by Bureau of Industrial Research recount a saving of space in airplane shipment as follows:

The studies which were made in reduction of space necessary in which to ship airplanes resulted in the cutting of the size of the boxes needed for a single machine 50 per cent. This would mean that with limited transportation facilities double the number of planes could be shipped in a single trip across the ocean. In one instance alone 50 carloads of freight were so repacked as to require the space of only 15 with its proportionate saving in cargo space.

To the work of the Bureau of Industrial Research of the Purchase, Storage and Traffic Division is due the conservation of space in thousands of freight cars and at least a million ship tons. Credit is also due the bureau for reduction in losses due to faulty and defective packing. As a result of the efforts of its experts, millions of dollars were saved in packing materials and many more millions of invaluable tonnage and cargo space for the use of the Army.

Martin Bomber in Record Flight

Capt. Roy N. Francis, who has charge of the army's plans for a transatlantic airplane flight, made a record-breaking air voyage from Washington to New York City recently, bringing four passengers in 2 hours and 15 minutes, which, for the 240 miles, made the speed of his machine nearly 107 miles an hour.

This flight was the swiftest ever made by a group as large as five. Col. F. R. Hertz, commanding officer of Bolling Field, Washington, was one of the passengers, and got his first view of New York from the sky.

The ship was a Glenn-Martin bomber.

Dirigible Hangar at Langley Field?

A Board of officers consisting of the following personnel, Col. William N. Hensley, Jr., J.M.A., A.S.A.; Col. James Prentice, J.M., A.S.A.; Major Frank M. Kennedy, J.M. Aer., A.S.A., Commanding Officer, Langley Field; Capt. John McInerney, A.S.A., met at Langley Field, Hampton, Vir., for the purpose of reporting upon the location of a dirigible hangar and making recommendations as to what Lighter-than-Air activities may be advantageously carried on at that place together with construction required therefor. Col. Arthur L. Fuller, charge of Lighter-than-Air Training and Acting Chief of the Training Section met with the Board at Langley Field.

Claims Record of 3 Miles per Minute

A new aviation record was claimed at San Diego, February 21, by Col. Walter G. Kilner, who flew to San Diego from Riverside, 115 miles, February 20, in 38 minutes with Major Albert D. Smith as passenger.

The average rate of speed was 180 miles an hour. Flight was made with a 400 horse-power De Haviland plane.

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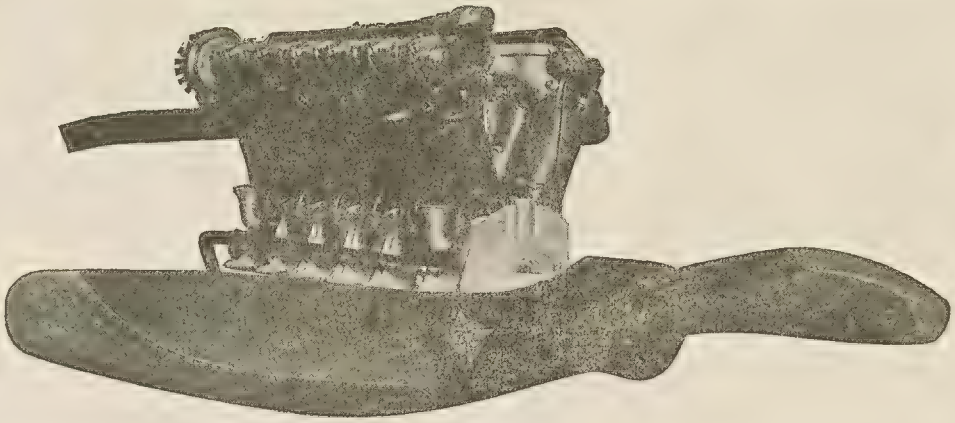

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An Achievement

WHEN, thru coming years, the big things of The Great War shall stand out in retrospective review, the truth will be realized that, in the forefront of achievements of dominating and lasting value and influence, the necessity of the hour gave to the world the development of the Airplane on a quantity production basis.

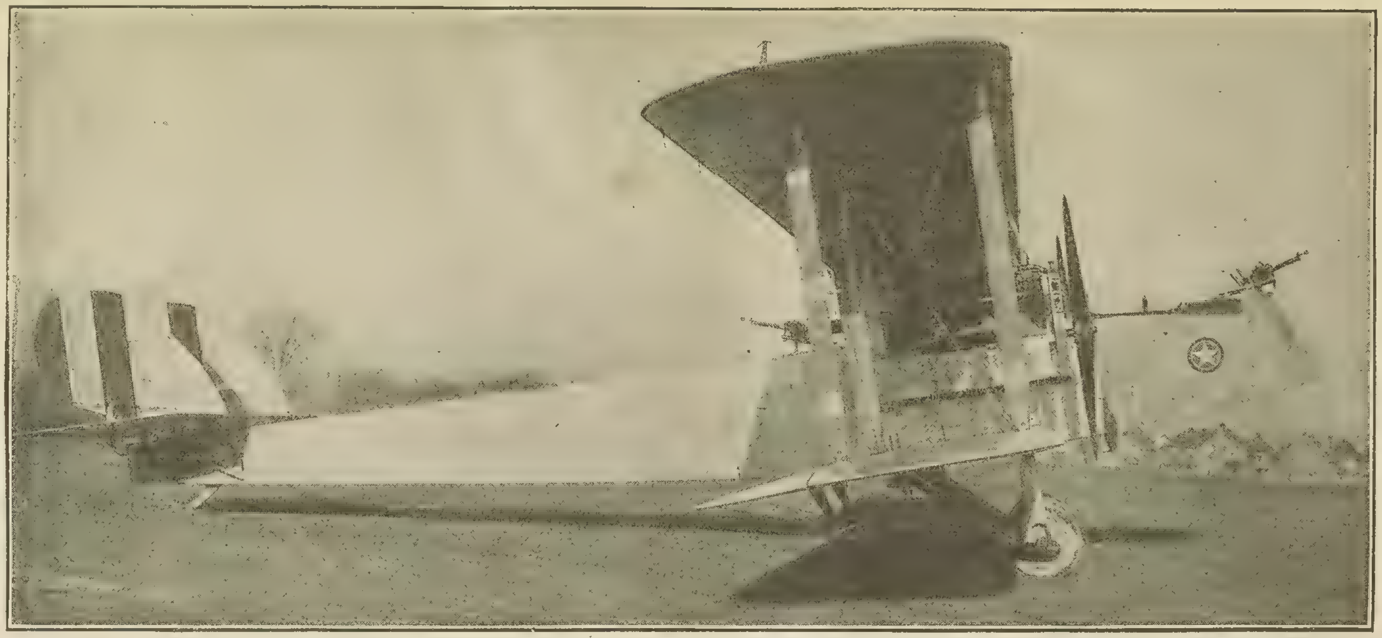
And thus a new industry was born. Some years before, two brothers in Dayton had invented, developed and produced a few successful heavier-than-air machines. It is with a feeling of just pride that—from a manufacturing standpoint—we can now look back over recent events and realize our achievement, along with that of so many others; and—

FOUR FACTS LOOM UP PREDOMINANTLY

1. The FIRST American-built battle plane was turned out by the Dayton-Wright Airplane Co.
2. The first planes this country sent to France were made in—and shipped from—our factory in Dayton.
3. We made and shipped over 80% of all the American-built battle planes that ever reached the Front.
4. The Dayton-Wright Airplane Co. produced more planes per day than any other plant in the world.

There were no precedents to guide the way. The thing had never been done before. But the issue was met—a new industry was born—the Airplane was made a manufacturing possibility on a quantity production basis. An interesting story of this work—in an attractive booklet entitled "An Achievement"—furnished free on request to those who may be interested.

The Dayton-Wright Airplane Company
DAYTON, OHIO
(The Birthplace of the Airplane)



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EXPOSITION EDITION—NUMBER TWO

AIR SERVICE JOURNAL

The National Aeronautic Newspaper

VOL. IV. No. 10 NEW YORK, MARCH 8, 1919 PRICE 10 CENTS

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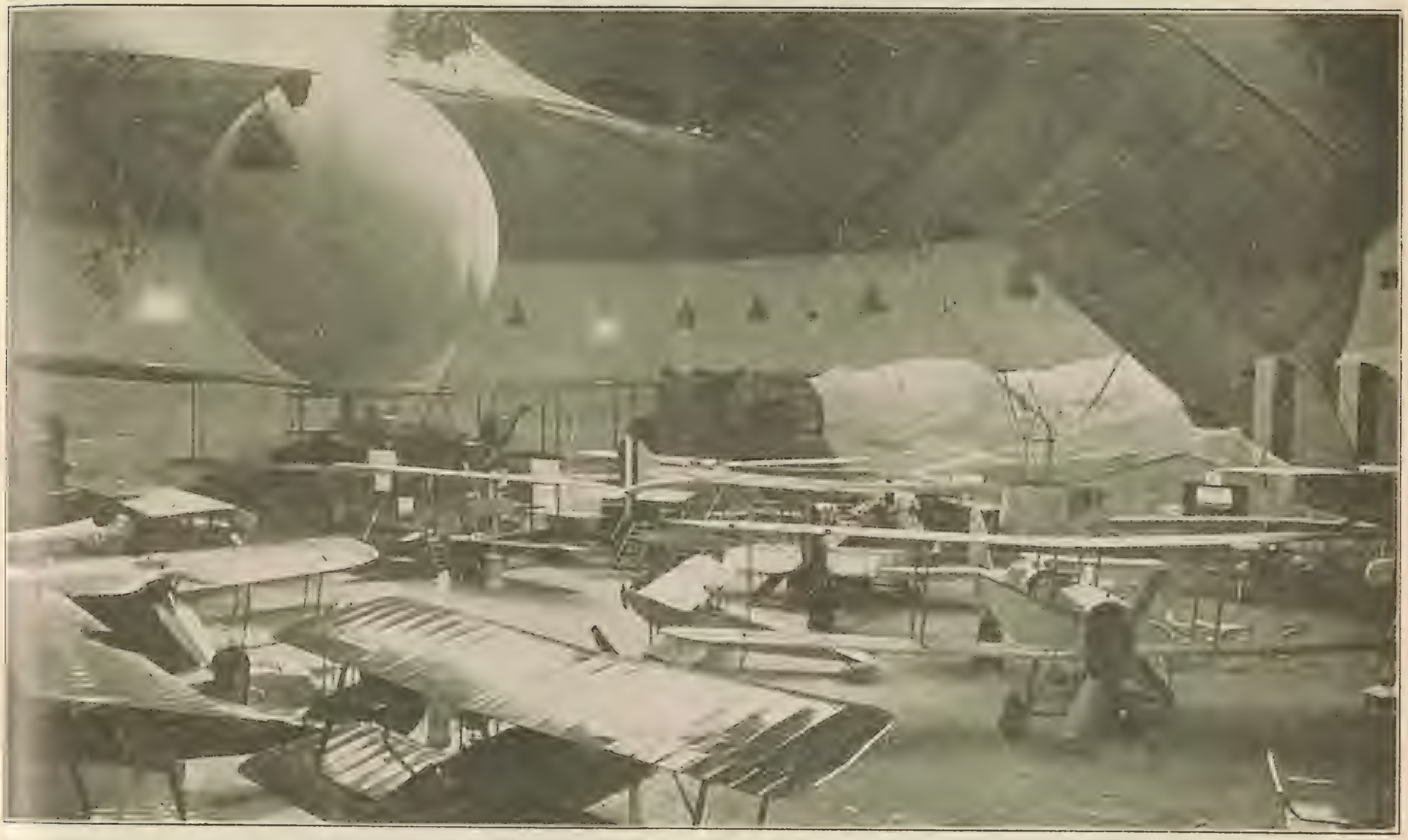
Aeronautical Exposition Displays Supremacy of the Many American-Made Airplanes



General view of Madison Square Garden, where the Exposition is being held. Close to the girders, which are camouflaged as blue sky, are seen the gigantic Caquot and the spherical balloons. In the immediate foreground is the Thomas-Morse exhibit. In the right center is the Dayton Wright "Honeymoon Express." At the extreme right is the tail of the Glenn L. Martin Bomber. To the left center is the Curtiss group of land and water ships and to the rear looms the huge Handley Page Bomber, as modified and built by the Standard Aircraft Corp.

Opening of the Show

Upon its completeness, upon the artistry which characterized the arrangement of exhibits and upon the number of people who have seen them at the Aeronautical Exposition in Madison Square Garden and the 69th Regt. Armory since March 1, the Manufacturers' Aircraft Association justly may felicitate itself.

Designed primarily by its sponsors as a public demonstration of the commercial future of the airplane, the show, because of the liberal co-operation of the Army and Navy, has taken on more the character of a review of wartime activities, though there are many evidences of the manufacturers' present devotion to pleasure and passenger-carrying craft.

After a few afternoon preliminaries such as the release of a number of balloons with a travel radius of fifty miles, carrying free tickets, the circling of the buildings by a half-dozen army planes from Mineola and the photographing of Mary Garden in a Dayton-Wright two-seated commercial plane with Captain Ugo D'Annunzio as its pilot, the exhibition got formally under way last Saturday night when Brig.-Gen. William Mitchell, just back from France, where he was chief of aerial operations with the First American Army, addressed a gathering of several thousand persons who had jammed themselves inside the Garden.

General Mitchell was escorted by the entire staff of Hazelhurst Flying Field to a platform erected just over the huge All-American bomber, designed and constructed by the Glenn L. Martin Company.

General Mitchell talked briefly of the state of the American air forces abroad at the time of the armistice, drawing much applause when he asserted that at that moment the American air forces had gained the ascendency in tactical operations over all their allies. In aerial gunnery, photography, signaling, patrolling, co-operation with the artillery, and other activities of the service, General Mitchell said, the Americans were unequalled at the last. He was cheered a moment later when he added that Ameri-

(Continued on page 15)

The

Annual Aeronautical Exposition

of the
Manufacturers Aircraft Association

at Madison Square Garden
and
69th Regiment Armory

March 1 to 15

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Outstanding Features of the Show

The Aeronautical Exposition has as its outstanding features the military and naval development of aviation. It shows what can be done to meet a specialized need. Hints here and there of the commercial and sporting use of airplanes and lighter-than-air craft are given, but the armament features are on nearly all machines shown.

The law of supply and demand will determine the future of aeronautics. Imagination plus business judgment will be required to create the demand as well as furnish the supply. Every exhibit seems to have an outstretched hand waiting for the public and industry to grasp. That this attitude will have its response is not to be doubted. It took time and patience to commercialize the railroad, telephone and wireless but it has been the the uniform experience of this country that, given something that does any work better, more quickly or more efficiently than by former methods, success is certain.

Perhaps the most significant sign of public interest in the Exhibition is the attention given to the smaller machines. The public seem to feel that these machines have both the advantage of low cost and easy control. It is a tendency to which the constructors will have to give serious attention. If the public can be interested in the smaller types, they will have to be so designed that landing speeds can be secured at the lowest possible rate.

Seaplanes, too, are attracting the public and it would seem that a rapid development of this branch of aviation will be one of the first results of the interest aroused.

International Co-operation

The most important thing to emphasize at this stage of aerial development is the necessity for cooperation between the great nations. Let us place our cards on the table, so that we can benefit fully from all information that will help in the evolution of flying. America and Great Britain more particularly should get together. Let us state plainly what are our plans, what we have accomplished, and also put down upon the table the accumulated observations on weather and other conditions that have been charted.

Great Britain has already established an Air Ministry that co-operates with manufacturers and co-ordinates all the branches of aircraft development. At the present moment in this country you have the army, the navy, the postal service and the Interior all engaged in aviation development. In the natural evolution of things I feel quite sure that within the next five years there will be a Department of the Air in this country to co-ordinate all these activities. It is a matter of business, and with their great business sense Americans will quickly realize its necessity.—*Gen. Guy Livingstone, R. F. C.*

Greetings

I have not yet had time to establish my office in Washington, but it is the intention of my government, and will also be my endeavor, to co-operate with those identified with aviation in this country to the fullest possible extent. I have been appointed to this new post by the British government not only in a military capacity, but also in a commercial capacity. Co-operation should be the keynote in all aviation development of the immediate future, and the greatest development of the art will be in the line of commercial endeavor.—*Gen. L. E. O. Charlton, R. F. C.*

Aviation in the Next War

The control of the air will unquestionably be the decisive factor in the next war, overshadowing in importance the forces on either land or sea.

The United States ought to profit by the experiences of the war with Germany and formulate a constructive program accordingly. We ought to continue to manufacture airplanes in reasonable quantities, but more than all we should endeavor to develop mechanical flight so as to be able, should the emergency arise, to achieve and maintain control of the air.

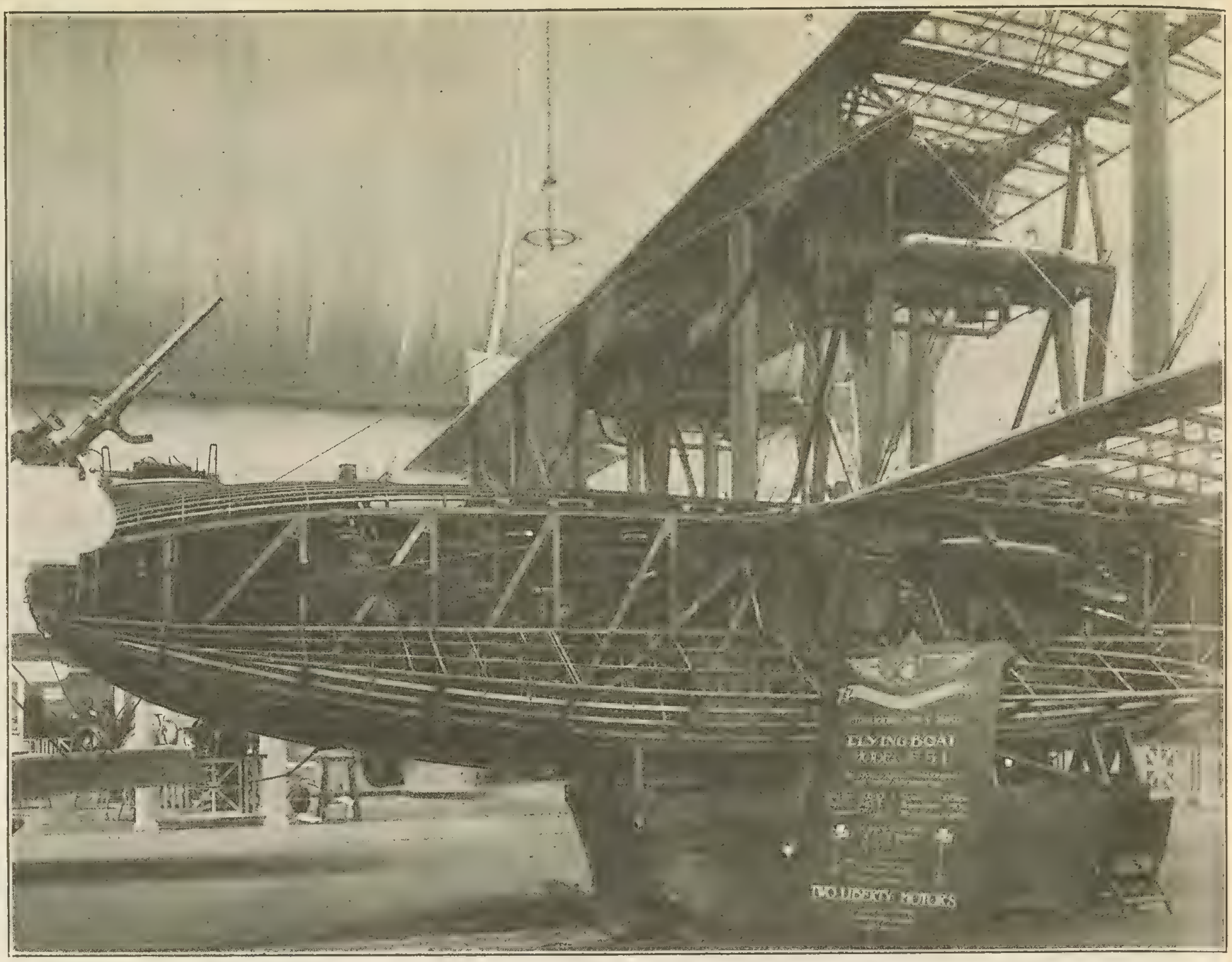
I believe that eventually aviation will have a great commercial future. How soon is a question, but, judged from the observations I have made during the 9 years I have been in the Senate, rapid progress should be made. As much of the trouble we experienced in getting ready to fight Germany was due to lack of preparation, so failure to consider now in a constructive fashion the whole aviation problem—military, naval, postal and commercial—will mean trouble in the future.—*Senator George E. Chamberlain.*

Keep an Eye on America

In questions of aeronautical policy we shall have to keep an eye on America. The war, we frequently tell ourselves, has been the salvation of the British race; it has brought out all its potential energies and resources as nothing else could have done. It must not be forgotten, however, that the war has done the same for other nations, and for none more than for the United States. For the first time America must be reckoned a great military power, with the capacity—hardly contemplated before—for effective intervention in European politics. Nothing has impressed the American missions which have visited this country so much as our titanic naval organization. It has been the one great revelation to them, and already they are talking of a navy strong enough to have a voice in determining the freedom of the seas. We may be quite sure that, after what they have seen of the part aircraft played in deciding the war, they are not going to neglect this new arm, either in war or in peace.

A United States wireless message of Friday states on the authority of Senator Chamberlain, the chairman of the Senate's Military Affairs Committee, that the committee will recommend the establishment of a separate bureau of the air with a cabinet officer at its head. This certainly looks more like business than the present hybrid arrangement at the War Office. America has been quick to see that air control is too big a thing to left in the odd corner of some existing department. "We ought," said Mr. Chamberlain is reported to have said, "to continue to manufacture aeroplanes in reasonable quantities, but more than that, we should develop mechanical flight so as to be able, should the emergency arise, to achieve supremacy in the air. The air problem rests on effort and co-operation. For that reason, we should unify all our efforts in a single department." Will Mr. Lloyd George and everybody concerned please note?—*Aeronautics.*

Many Interesting Government Exhibits, Including the Navy F-5-L



Interior Body View of the Navy F-5-L

United States Navy

Probably in the exhibits displayed by the U. S. Navy the one of the greatest interest to the public is a scale model of a D-class coast patrol airship which is filled with *helium*—the non-inflammable lifting gas which the skill of American chemists has succeeded in producing in large quantities and at a comparatively low cost. If anyone should entertain the slightest doubt regarding the gas which keeps this model taut—thinking perhaps it is air, as in the case of all other lighter-than-air craft exhibited—let him or her notice the pull this model exerts on the rope to which the nose of the ship is secured. Of course, it is becoming common knowledge that the quantity production of this gas will bring lighter-than-air into the domain of the public as fast carriers of passengers and goods, while it promises to greatly alter the future aspects of aerial warfare.

Another exhibit, the scale model of a beautifully streamlined rigid airship fitted with four cars is of particular interest in view of the Navy's intention to build with part of the coming air appropriation four rigids of general Zeppelin type. These vessels will be used for scouting over long distances.

There is also exhibited the car of an Astra-Torres airship which was transferred during the war from the French to the American flag and was used for patrol and convoy work by the U. S. naval forces; this vessel was stationed at the naval air station at Paimboeuf, France, and saw a great volume of service, hence eliciting considerable sentimental interest.

The heavier-than-air branch of the Navy is well represented by a full sized F-5-L flying boat built by the Naval Aircraft Factory, whose wings span 103 ft., and which is therefore the largest machine exhibited at the Aeronautical exposition. In order to have the public fully grasp the amount of work involved in the construction of such a craft, one-half of the F-5-L is shown entirely stripped of its planking and wing covering. The beautiful workmanship of the structure as well as the wealth of equipment contained in such a large patrol craft can thus be examined at leasure. The armament of this craft is not the least impressive of its features, for this consists of one Davis Q. F. gun, which is mounted on the bow, and nine Lewis machine guns, the latter being distributed in such manner that there is hardly a dead angle of fire to this ship. In addition to the Davis and twin Lewises, aft, a set of triple machine guns is fitted behind either board, just aft of the engines, and can be swung out through suitable doors when the boat is in flight. Surely the F-5-L can't be a pleasant sort of an adversary in a scrap.

The F-5-L boat seaplane is a twin-motored tractor biplane driven by two Liberty engines and capable of carrying five men with ammunition and bombs for eight hours at a rate of eighty miles an hour through the air. The total weight of the whole machine fully equipped is almost 14,000 pounds. The following figures give briefly some of the characteristics of this craft:

Wing span, upper	103′ 9¼″
Wing span, lower	74′ 3⅜″
Length overall	49′ 3 11/16″
Height	18′ 9¼″
Chord	8′ 0″
Gap	8′ 10½″
Incidence wing	4 deg.
Dihedral	1½ deg.
Draft (full) inches	27″
Total wing area	1397 sq. ft.
Empty (incl. water)	8250 lb.
Useful load	4750 lb.
Gross load	13000 lb.
Lbs. per sq. ft.	9.31 lb.
Motors	2 Lib'ty 12
Horse power	800
Crew (wt.)	4 720 lb.
Maximum speed (m.p.h.)	87
Endurance (C.S.) hours	7.9
Guns	4 Lewis 1 Davis

Other interesting exhibits comprise a section of carrier pigeons, one of which has the distinction of having established the Navy record with 585 miles of uninterrupted flight; Navy type Liberty engines of the direct drive and geared down models; a complete set of the radio telephone apparatus used on the F-5-L flying boat, one of which is, by the way, installed in the machine exhibited alongside with a wireless telegraphy set; Lewis and Davis guns, serial bombs varying from 112 to 520 pounds, some of which are of the depth bomb type, for use against submarines; and various parts and accessories.

The photograph display of the Navy is also well worth mention.

United States Army

The major exhibit of the army is the Martin twin-engine night bomber which is in the estimation of "those in the know" one of the most remarkable machines of the Exposition. If one stops to consider the difficulties involved in designing a successful twin-engine airplane, the achievement of the Glenn L. Martin Co. will be appreciated in its true merit, for the performance of this bomber is a fitting companion to the workmanship it displays.

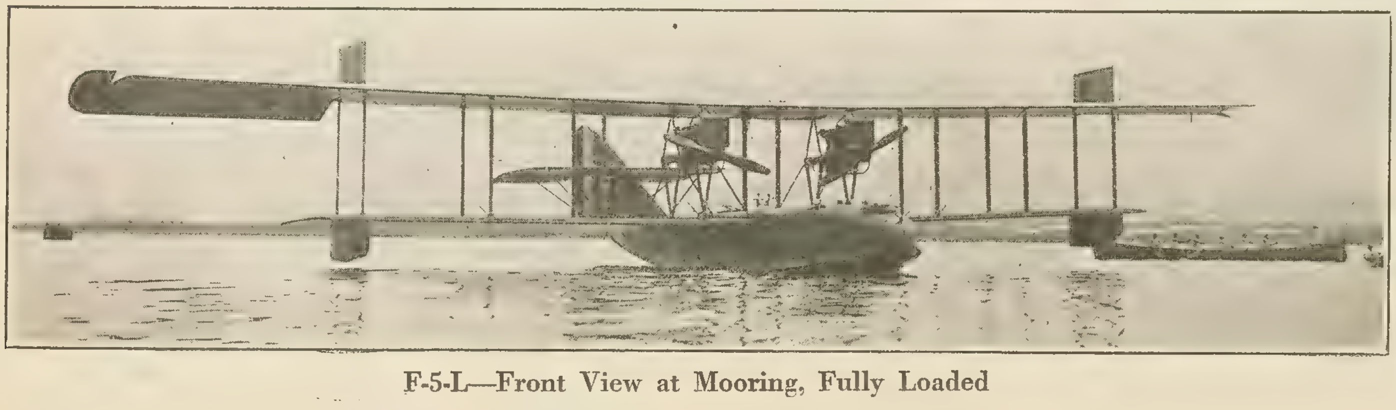
Great interest attaches also to other two night bombers exhibited by the Army, the Handley Page and the Caproni. The former is at the Garden, while the Caproni triplane is at the 69th Regiment Armory. As the Martin and the Handley Page face one another, just like the Caproni and the F-5-L flying boat, the public is afforded an excellent opportunity for comparing the impressive sizes of our largest heavier-than-air craft.

Two well known pursuit airplanes, of which the public has heard a good deal in press reports, namely the Spad and the SE-5A, of French and British design respectively, are shown in the shadow—so to speak—of the giant Handley Page. These two types were almost exclusively used by the American Air Service on the Western Front when the war came to a victorious end, and figured in most of our air victories.

A comprehensive set of aircraft engines is also exhibited by the Army; beside the more well known makes, such as the Curtiss, Hall-Scott, Liberty, Le Rhone, Gnome Monosoupape, there are to be found some engines of representative foreign manufacture which attract particular attention. Among these the French 12-cyl. air-cooled Renault and the 6-cyl. water-cooled Mercedes are known to engineers from descriptions published in various technical maazines, such as *Aviation and Aeronautical Engineering*, though there has not been any previous opportunity for examining them in detail. There is also exhibited an Austrian engine marked with an "H," —apparently a Hiero, which is manufactured by the Warchalowski works at Vienna; this possesses unusual distinction for having extensions at either end of the crankshaft for fitting an airscrew, an arrangement which is probably due to a demand for an engine that could be fitted indiscriminately with a tractor or a pusher screw, or both, without changing the sense of rotation.

A photography motor lorry, with dark room trailer, and a kite-balloon winch, both of which have seen service in France, illustrate some of the ground material of the Air Service.

A very comprehensive photographic section completes the Army exhibit.



F-5-L—Front View at Mooring, Fully Loaded

Packard Motor Car Co.

Packard Airplane

After laying down the designs of our new line of Packard aircraft engines, our engineers turned their attention to the designing of an airplane around the smallest model to obtain a finished product which should have incorporated in it the greatest number of valuable features made possible by this new engine.

The Packard two-passenger biplane has been designed around and to be a complete unit with Model 1-A-744 engine.

The engineering department, in designing this plane, has kept in mind the safety of the passengers above everything else, and as strength and reliability mean safety, every detail has been carefully scrutinized before its adoption, with these features in view.

This plane is designed to make use of the very best materials obtainable and to have the ample factor of safety of safety of over seven (7).

It is designed for the man who appreciates the necessity for the utmost reliability in airplanes, and who, at the same time, wants a light, snappy, maneuverable machine capable of the very highest order of performance consistent with reasonable economy and comparatively slow landing speed.

The following is a brief specification covering this plane:

Power Plant

Packard 8-cylinder, 160 hp. engine; 160 hp. at 1525 r.p.m.

Weight, complete with propeller hub, self-starter, battery and engine water, 585 lbs.

Fuel consumption, .50 to .54 lbs. per hp. hour at sea level.

Wing and Surface Areas

	Sq. Ft.
Main planes, total	387
Ailerons, total	48
Vertical fin	5
Rudder	11
Tail plane	30
Elevator, total	22

Weight

	Pounds.
Machine empty	1,520
Gasoline	210
Oil	30
Water	52
Tools and extras	25
Pilot	165
Passenger	165
Normal flying weight	2,167
Weight, pounds per hp.	13.5
Wing loading per sq. ft.	5.6
Permissible extra luggage	100

Performance (Estimated)

High speed near sea level	102	m.p.h.
High speed at 5,000 feet	100.5	m.p.h.
High speed at 10,000 feet	98	m.p.h.
High speed at 15,000 feet	90.5	m.p.h.
Climb to 5,000 feet	7.5	min.
Climb to 10,000 feet	18.1	min.
Climb to 15,000 feet	34.5	min.
Absolute ceiling	19,500	ft.
Fuel range wide open near sea level	2.5	hrs.
Fuel range wide open at 5,000 feet	3	hrs.
Fuel range wide open at 10,000 feet	3.5	hrs.
Fuel range wide open at 15,000 feet	4	hrs.

As indicated, the performances are estimated, but as these estimates have been checked by two well-posted aerodynamic engineers, we feel sure they are accurate within a very small percentage.

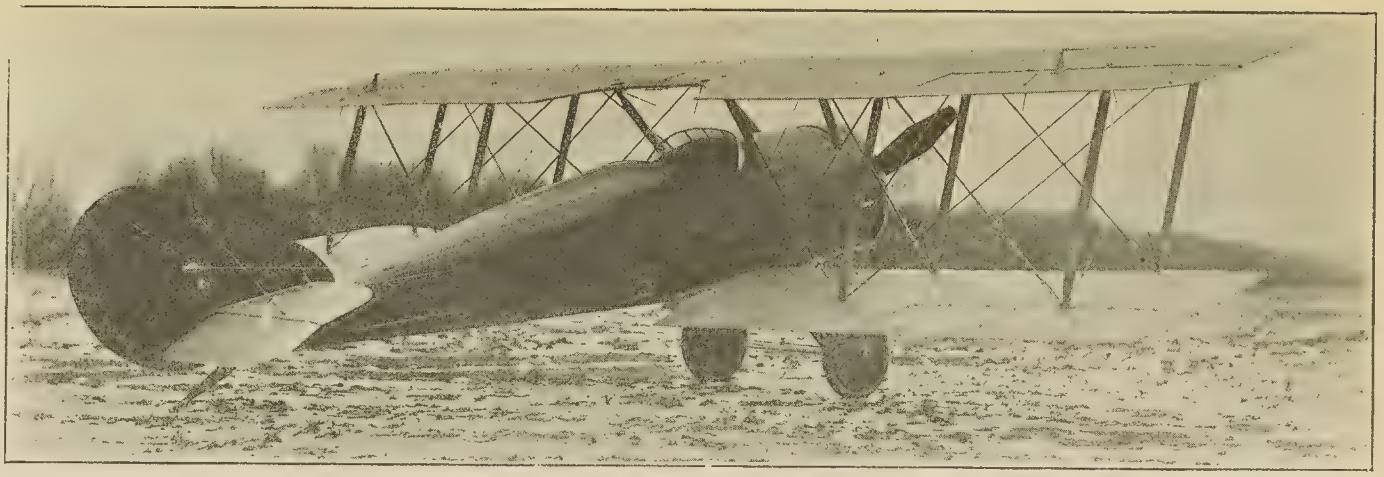
This machine will make approximately 100 miles an hour with full load, on account of its comparatively light weight and its clean-cut design; on the other hand, it will land at a speed quite as low as the usual primary training machine. This combination is very valuable as it makes possible fast cross-country trips and at the same time it gives the ability to land in comparatively small fields. To further facilitate landing in unknown fields, the landing gear is located well forward to guard against nosing oper and the tail skid has been made extra rugged to take care of unusual strains and shocks.

On account of the arrangement of the carburetor, with its air intake protruding through the lower part of the fuselage, it is absolutely impossible to set this plane on fire under any condition, which is a feature that will be greatly appreciated by those who have had air experience.

The comfort of the passengers has been carefully looked after. The engine is entirely housed in, making it impossible for oil or gases to blow back in the passengers' faces, and bulk heads are provided on each side of each passenger to prevent drafts, which is a feature that will be appreciated by those who have had experience in flying in disagreeable weather.

The rear cockpit is arranged especially for the pilot, but the necessary dual controls are provided, so it can be flown from the front seat, thus making it possible to use this machine for instruction work when desired. The controls in the front compartment, however, can be removed quickly, if it is desired to make it impossible for the passenger to interfere.

The exhibit is in charge of Dr. H. H. Hills, assistant general manager; T. A. Stalker, Fred Hoover, Walter E. Lees and D. C. Prentiss.



Thomas-Morse Type S-7, Side-by-Side Two-Seater

Length overall—21½ ft.; Spread—32 ft.; Height—9 ft.; Total weight loaded—1530 lbs.

To meet the demand for side-by-side seating, an entirely new machine in the type S-7 is now ready for those desiring this seating arrangement. It has been designed particularly for civilian use, attention having been directed to comfortable seating arrangement, there being ample room without crowding. The cockpit is lined throughout, with the control wires beneath the floor boards. This machine is well adapted to passenger carrying, permitting conversation between pilot and passenger with little difficulty.

It has a high speed of 90 miles per hour, climbs 6700 ft. in the first ten minutes, and lands at 38 miles per hour.

Budd Wheel Corp.

The following types of aeroplane wheels are shown by the Budd Wheel Corp:

DeHaviland, JN-4 Training Plane, Bristol Fighter and Thomas Morse Training Plane. Also—aluminum stream line covers for aeroplane wheels and a type of disc wheel and some special types of wire wheels.

At the exhibit are the following representatives of the Company: Edward G. Budd, President; Hugh L. Adams, Vice-President; W. G. Armstrong, Manager; Louis Fine, Engineer; C. H. Machen and Harry Cruse of the Sales Department.

The Budd Wheel Corporation manufactured more wheels for aeroplanes during the War, for the Government, than any other American Manufacturer, and its design of hub for the training plane wheel was adopted by the U. S. Signal Corps as standard.

In addition to the wheels shown, it manufactured wheels for the Handley-Page and also for Caproni Planes.

John A. Roebling's Sons Co.

The John A. Roebling's Sons Company are exhibiting a complete line of aircraft wire, strand, cord, thimbles and ferrules, as well as insulated wire and flat wire as it applies to aircraft construction. Special construction balloon cable is also exhibited.

The exhibit is arranged in a series of glass covered cases and is planned to be of interest to both the designer and constructor of aircraft.

A novel feature of the exhibit will be a visual representation of the extremely high strength of a steel balloon cable having a copper conductor center which was supplied to the Government during the War. This cable is the strongest cable in the world of its size.

John J. Fitzpatrick and Horace E. Thorn represent the company.

Jones-Motrola, Inc.

This Company has on exhibit the following articles: Jones Airplane Tachometers; Marine Tachometers; Stationary Tachometers; Hand Tachometers; Jones Air Speed Meters; Jones Hub Odometers for Motor Trucks; Jones Motrolas and two complete Airplane Instrument Boards.

J. Leopold is in charge of the exhibit while Charles Thiele is his alternate. The first mentioned is Mechanical Engineer and Sales Manager while the latter is Designer. M. J. Dobler, Salesman and George DeCesare, Draftsman will also be on duty.

Ericsson Manufacturing Co.

The Ericsson Manufacturing Co. has on exhibition several of type D-81 Berling Magnetos, thousands of which were used on the OX-5 motor in the training planes thruout this Country and Canada.

In addition it exhibits a complete assortment of various types of Berling Magnetos for aircraft, marine, truck and automobile motors. Also exhibited for the first time its type J-12, 12 cylinder, Berling Aeronautical magneto.

The following members of the organization are in attendance: W. C. Berling, Vice-President and General Manager; T. S. Hemenway, Treasurer; E. L. Valance, Sales Manager; R. Chauveau, Engineering Manager; K. S. Taylor, Engineer; Chester Smith, Engineering Department; H. E. Walker, Eastern Representative.

Stewart Hartshorn Co.

This company is making an exhibit of "Streamline Wire Tierods" and "Strap End Fittings" which have been so highly approved by the Government engineers as well as by the engineers of different manufacturers of air ships.

The exhibit is in charge of J. M. Layng, the company's wire expert, and B. E. Bushnell, general sales manager.

Standard Turnbuckle Co.

This exhibit is shown in the 69th Regiment Armory. It consists mainly of turnbuckles, in which the company specializes. Approximately fifty sizes will be shown, such as are used by the United States and foreign governments. There is also an exhibit of forked ends and other special parts.

The Cold Light Mfg. Co.

This exhibit consists of various types of instruments which have been used for war purposes, and which have been equipped with Radium Compound for night use. The main portion of these are aeroplane instruments.

J. H. Morrison is in direct charge of the exhibit and is assisted by E. D. Davis, the Manager of the Cold Light Mfg. Co.

Arthur Johnson Mfg. Co., Inc.

The Arthur Johnson Manufacturing Co. has a complete exhibit of Aviation jewelry, bronze presentation plaques, and also has on sale the official souvenir medal of the show. Chas. D. Bergen, Secretary-Treasurer of the Company, is in charge of the exhibit.

The Dayton Engineering Laboratories Co.

This exhibit consists of generator battery type ignition apparatus manufactured as applied to modern high-powered aeronautical engines. The exhibit includes:

Delco ignition apparatus as in use upon each and every Liberty Aircraft engine 12 and 8-cylinder models.

Packard-Delco ignition for Packard Aviation engines 8 and 12-cylinder models.

Delco ignition for Lorraine-Dietrich 12-cylinder engines of French Aviation service.

Delco ignition for Hall-Scott Aviation engines 4 and 6-cylinder models.

Delco ignition for Duesenberg 16-cylinder Aviation engine.

In addition a complete 12-cylinder duplicate ignition equipment is shown operating.

Several test fixtures used in the manufacture and test of Delco Aviation ignition is also shown.

Various parts during the interesting processes of manufacture are shown in various stages of production from rough stock to finished parts.

A photographic exhibit of Research and Experimental Laboratory and factory facilities is shown.

The process of bakelite molded insulation which is extensively used upon Delco Aviation equipment is shown by exhibits of parts during process of manufacture as well as some of the tool steel dies used in its manufacture.

The Dayton Engineering Laboratories Co. is represented by O. T. Kreusser, Engineer Aviation Ignition L. V. Larson, Engineer and H. L. McComb, Engineer. All of these men have specialized upon modern Aviation ignition, having devoted the past fifteen months to the training of engineering officers and mechanics of the Army and Navy Aeronautical service.

Livingston Radiator Corp.

The company has on exhibition:

1—A radiator of the type made for all of the Handley-Page Machines manufactured in this country.

2—A radiator of the type we manufactured for the type J-1 Training Plane of the United States Navy.

3—A radiator of the type manufactured for the Curtiss Seaplane.

4—A radiator of the type we manufactured for the H-16 type Plane of the United States Navy.

5—A radiator of the type we manufactured in the earliest days of aviation for cooling the engine of planes carrying 2 engines of 30 H.P. each.

The company is represented by D. McRa Livingston, Vice-President; H. M. Bailey, Treasurer and R. C. Raber, Superintendent.

Remarkable Exhibits of the Curtiss Aeroplane and Motor Corp.

Curtiss Model H-A Hydroaeroplane

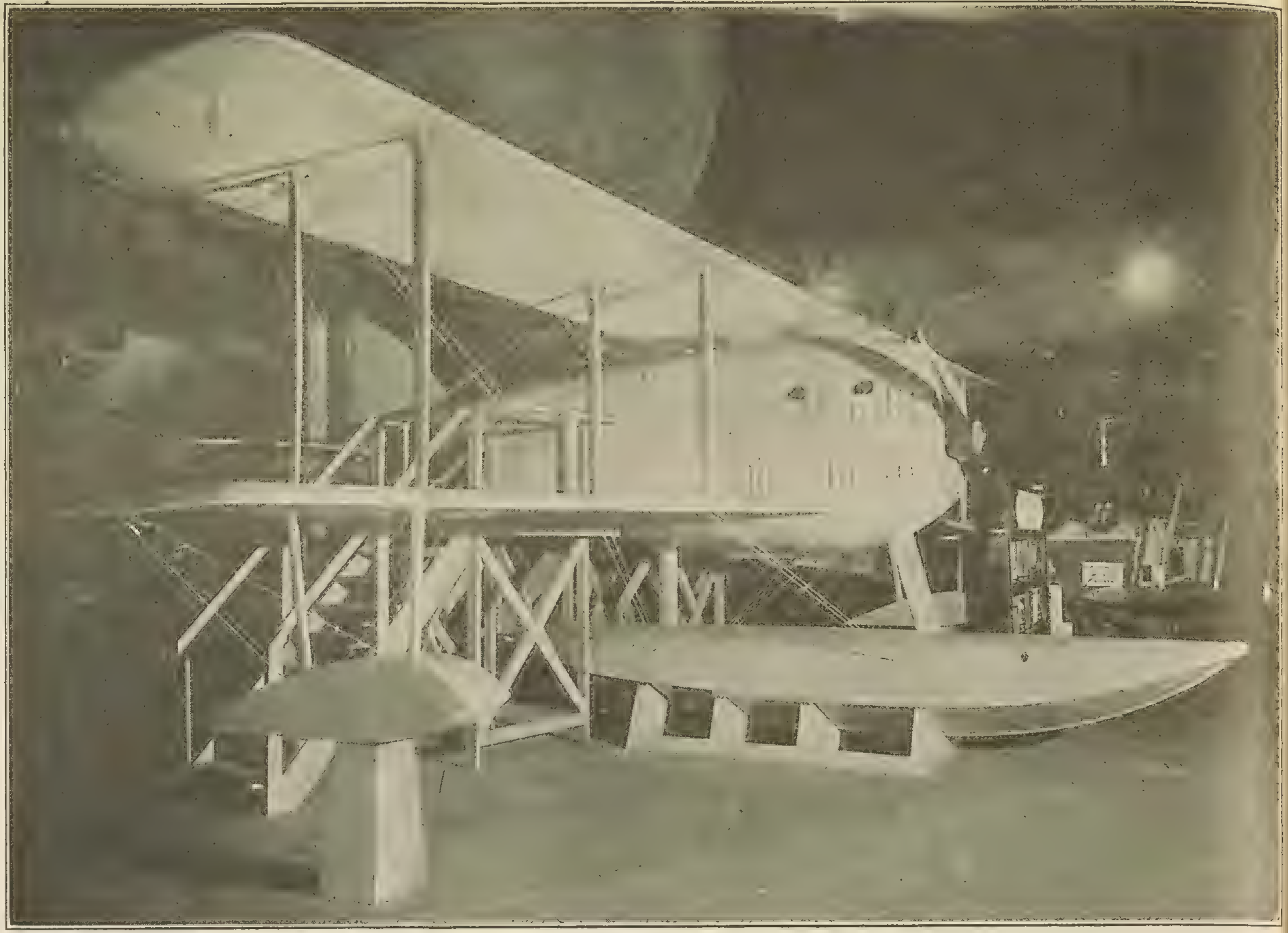
The Curtiss Model H-A hydro-aeroplane is really a land machine; equipped for water flying. It has a main pontoon and the wings are supplied with small pontoons at the outer ends.

It is the type of machine that satisfies the desire for speed and, at the same time, will land on the water. In addition, it has a great weight-carrying capacity.

Equipped with the Liberty-12 motor this machine has a maximum horizontal flying speed of 130 miles per hour and a minimum of 62 miles per hour. It will climb 8,500 feet in ten minutes.

It has an upper and lower wing span of 36 feet and a chord of 72 inches.

It weighs, empty, 2,638 pounds and will carry a useful load of 1,012 pounds.



Curtiss Model H-A Hydroaeroplane

Curtiss Model MF Flying Boat

The Curtiss Model MF flying boat, which was built at the Garden City plant, is the smallest of the Curtiss flying boats and, at the same time, one of the most popular.

It is a development of the old F type of boat which is well-known throughout the world.

It is the type of aircraft that will appeal to the beginner because of its ease of manipulation and, at the same time, its facility in landing. It will skim over the water like the flying fish or soar into the clouds like a gull, with the same graceful ease and in less time than its feathered progenitor. It rises from and lands on the water with ease and dispatch, even when there is a considerable sea running.

It is the type of machine which, in the opinion of aeronautical men, will first attain general popularity because of its ability to land on water. (The progress of the land machine will, of necessity, be limited by the rapidity with which landing fields are established throughout the country.)

Glenn H. Curtiss is the leader in the development of flying boats. From his first attempt—placing floats on the machine which he used in the historic Hudson River flight—there has been a steady development along these lines and the acme of achievement is represented in the MF sportsman's model.

It is a "pusher" type with the propeller and motor located in the rear of the pilot's seat. It has a maximum horizontal flying speed of 69 miles per hour and a minimum of 45 miles per hour. It will climb 5,000 feet in 27 minutes.

It has a wing-span of 49 feet 9⅜ inches, is 28 feet 10 3-16 inches in length, and is 11 feet 9⅝ inches in height. It weighs 1,796 pounds, empty, and will carry a useful load of 636 pounds.

It is driven by a Curtiss OXX eight-cylinder "V" motor which develops 100 horse power at 1,400 revolutions per minute and has a maximum range at economic speed of about 325 miles. It is built to carry two passengers abreast.

Curtiss Model 18-B Biplane

The Curtiss 18-B biplane is the same machine that, equipped with tri-plane wings, established a new world's speed record in government test. This machine travelled at the rate of 161 miles per hour, adding fifteen miles to the previous records. It also proved itself an exceptionally good climbing machine, attaining an altitude of 16,000 feet in ten minutes.

It is a development of the combat type of machine, designed and constructed for the United States Navy by the Curtiss Engineering Corporation at Garden City, L. I., and, had the war continued, it would undoubtedly have proven itself one of the leading fighting planes.

In general form, it is quite different from the prevailing types and it has little in common with the European designs. From the end of its bird-like tail, it shows a remarkable resemblance to the fast-flying bird, except that it has two sets of wings.

The body is elliptical in section and is carefully modeled to secure the wonderful "streamline" form which high speed demands.

The machine is 23 feet 3 3-16 inches long and 9 feet 10⅜ inches high. Empty it weighs 1,825 pounds, but it carries a useful load of 1,076 pounds.

It is essentially a speed machine and one whose maneuvering ability is well-known.

Equipped with the new Curtiss 400 horse power K-12 motor, which is also a recent development, this machine with biplane wings, should establish still greater speed records than its triplane.

The K-12 motor is considerably lighter than any other 400 horse power motor in existence. In every test to which it has been subjected it has warranted the prediction that it will take its place as one of the world's greatest engineering achievements.

Curtiss Model JN-4D-2 Biplane

The Curtiss JN-4D-2 biplane tractor, which is being shown at the Aeronautical Exposition at Madison Square Garden, is the latest development of the type which was used in training 95 per cent of the American and practically all of the Canadian aviators.

This model was designed, constructed and built at the Churchill street plant in Buffalo, under the supervision of James E. Kepperley, the general manager.

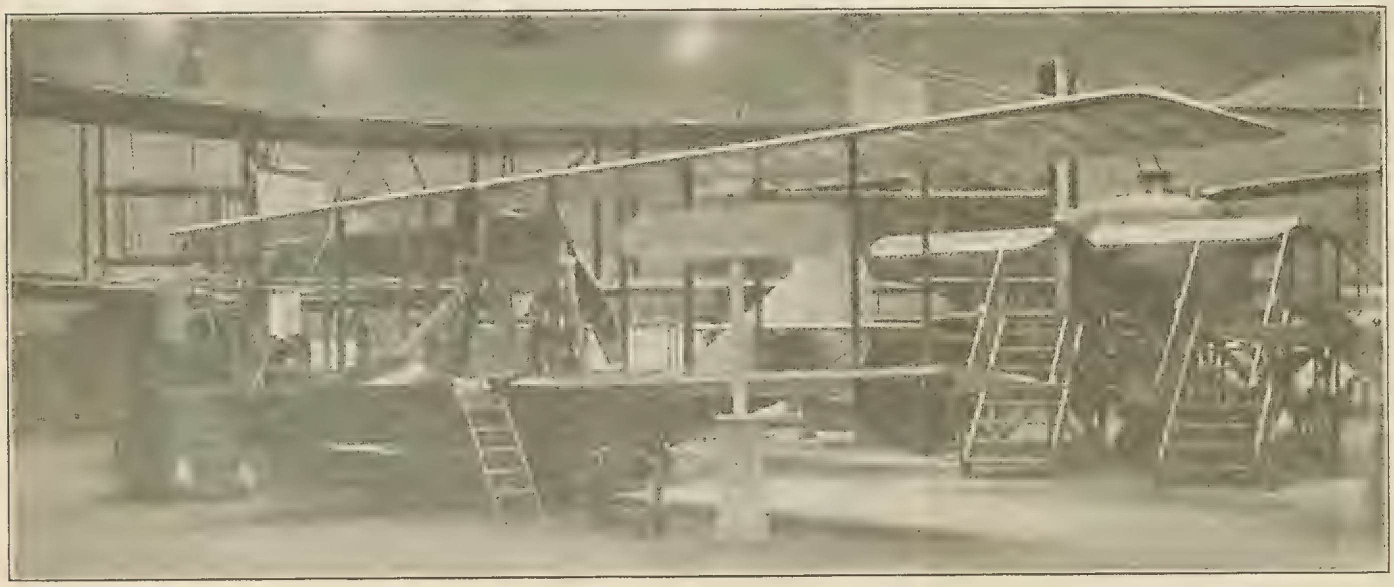
It is unique in that it is the first time that one plane has combined the characteristics of the finished product and, at the same time, shows interior construction. The idea was developed by Mr. Kepperley and, as a result, the show model is covered on one side only.

From its laminated mahogany propeller to the tip of the elevator, it is a masterpiece of expert workmanship. Every fitting is nickelplated; its struts and framework are of choicest ash and spruce, highly polished; the finest fabric is used in covering the wings and fuselage; its mahogany dash is adorned with the latest instruments known to the aeronautical world. The cowling is of sheet aluminum with navy gray enamel.

The JN-4D-2 is equipped with a Curtiss OX-5 motor which has gained an international reputation for its dependability.

It was the JN-4 type, along with the R-4, that the Post Office Department used when the first regularly established mail service was begun in May, 1918, between New York City and Washington, D. C.

The JN-4D-2 plane has a horizontal speed of 75 miles per hour and a minimum of 43 miles per hour, and it will climb 5,000 feet in ten minutes.



Curtiss Model MF Flying Boat

It has an upper wing span of 43 feet 7⅜ inches and a lower wing span of 33 feet 11¼ inches. The depth of the wing chord is 59½ inches. The machine is 27 feet 4 inches in length and 9 feet 10⅝ inches in height.

Powered with an eight-cylinder "V" type Curtiss OX-5 motor which develops 90 horse power at 1,400 revolutions per minute, it consumes slightly less than one-half pound of gasoline per horse power hour. It is, therefore, an economical machine for use in training students or for general pleasure flying.

The JN-4D-2 is comparatively light and for its weight of 1,580 pounds will carry a useful load of 550 pounds.

It is equipped with dual control and carries two passengers "tandem." At economic speed it has a maximum range of about 250 miles.

In addition to its achievements as a training and mail-carrying plane, the JN-4 has performed some remarkable feats. In his flight from San Diego, Cal., to New York and return, Major Albert D. Smith of the United States Air Service used this machine. He made the trans-continental flight in thirty-five hours, flying in all kinds of weather conditions.

During the last two years the Curtiss factories in Buffalo and Hammondsport, N. Y., have produced more than 6,000 of these planes for the American and Canadian Governments.

Curtiss Model H-16-A Flying Boat

Already the question is being asked: "What is the ideal passenger carrying airplane?"

That is a question which will have a series of answers each successively better, but for the present it can be said that airplanes which travel over water are best prepared to begin a passenger service. They need no special landing fields. They can travel all the year round. And—what is far more important—they have reached a high degree of safety and efficiency in the Curtiss Aeroplane and Motor Corporation plants. The N-C-1 flying boat, with the largest passenger list to date, is a Curtiss production; the H-16-A is a smaller Curtiss type with a capacity for eleven passengers which will be used in the new Curtiss line from Garden City to Miami, Fla.

Glenn H. Curtiss built the first successful flying boat at San Diego. Its thirty-foot wing span and 60 H. P. motor may be interestingly contrasted with the 96 feet and 46 feet length, and the two Liberty motors which together develop for it 660 H. P.. The first flying boat reached a speed of almost 60 miles an hour; the H-16-A can count on ninety-five. And at economic speed it has a range of 675 miles, on full gasoline capacity.

Curtiss 18-B Biplane

The H-16-A will carry three thousand pounds, over a thousand of which may be left free for passengers exclusive of the crew. It will prove of ideal size and speed for passenger traffic, and its solid construction and twin motors offer excellent guarantees of security.

Curtiss K-6 and K-12

The K-6 and K-12 are the latest Curtiss development. Weighing considerably less than any other aeronautical motor, the K-12 develops more horse power. It is the "V" type en bloc and of aluminum construction. The bore is four and one-half inches and the stroke six inches. The cooling is effected by a centrifugal water pump and lubrication by pressure feed. Two high tension magnetos are used for ignition. The engine weighs without oil or water 700 pounds, which gives a dead weight per rated horse power of 1.86 pounds. The gasoline consumption is 0.55 pounds per brake horse power, the oil consumption, 0.03 pounds per brake horse power. The installation dimensions are: Overall length, 68 5-16 inches; overall width, 27⅞ inches; overall depth, 40⅛ inches; width at bed, 15¾ inches; height from bed, 24 3-16 inches; and depth from bed, 15 15-16 inches.

Curtiss K-12 Engine

Curtiss OX-5

This motor is unqualifiedly the best known aeronautical motor in the world. It established a reputation for dependability in its use at the American and Canadian training fields, and it is as well known in Europe as in America. There was great demand for it during the war period and 6,000 were produced for the Allied governments during the war.

It is an eight-cylinder "V" type and develops 90 horse power at 1,400 revolutions per minute. The bore is four inches and the stroke five inches. A centrifugal water pump effects the cooling, and lubrication is by force feed. The engine weighs without oil or water, 375 pounds and the dead weight per rated horse power is 4.17 pounds. The gasoline consumption is 0.60 pounds per brake horse power and the oil consumption is 0.030 per brake horse power. The installation dimensions are: Overall lengths, 68 5-16 inches; overall width, 27⅞ inches; overall depth, 40⅛ inches; width at bed, 15¾ inches; height from bed, 24 3-16 inches; depth in bed 15 15-16 inches.

Gio Ansaldo & Co.

1. SVA ITALIAN LONG-DISTANCE RECONNAISSANCE AND DAY BOMBER.

The Sva has been studied and designed by Colonels Savoia and Verduzio of the Italian Army for the Spa motor with the aim of including all the most scientific development of aviation and attaining a maximum of efficiency.

Specially remarkable in the Sva are:

(a) The minimum head resistance of the whole machine.

(b) The special wing section.

(c) The rigid trussing of the wings with oval streamline steel tubing, totally dispensing with the use of cables and the need of frequent regulation.

(d) The form and construction of the fuselage gradually passing from the rectangular to a triangular section, which gives very efficient aerodinamical results. The fuselage is all built of wooden longerones and ribs and plywood panels, being extremely rigid, strong and light.

The specifications of the Sva are:

Motor—Spa, Ansaldo, 6 cylinders, 220 hp.

Speed—140 miles per hour.

Climb—20.000 feet in 30 minutes.

Useful load—1000 lbs.

Normal flight endurance 6 hours 840 miles (with 250 lbs. of bombs or mail).

Armament—Two fixed machine guns firing through propeller.

The Sva is also made in two seater and hydroplane types. This type has been largely used at the Italian front.

The squadron of seven (7) Svas, commanded by Major Gabriel d'Annunzio flew from the Italian front to Vienna, bombarding the city with propaganda papers and returned, covering more than 700 miles with a total duration of the flight of 6 hours 40 minutes.

Other remarkable records of the Sva are:

Torino-Udine-Torino, 700 miles in 5 hours.

Malpensa-Foggia-Bologna, 900 miles, in 6 hours 50 minutes, and a great number of war reconnaissance and bombardments over Austrian and German soil.

In America a Sva piloted by Sergt. Gino made brilliant official tests and flew from Langley Field, Va., to Washington in 1 hour and from Washington to Belmont Park, Long Island, in 1 hour 30 minutes.

2. "BALILLA," OFFICIALLY CALLED "ANSALDO I."

The "Balilla" is the Italian combat plane, single seater. It has the same motor as the Sva and is built on the same principles, but in smaller dimensions in order to obtain still greater manoevering attitude, climb and speed.

On account of the smaller wing spread, the wing truss is reduced to a system of two steel struts for each wing with the usual cross cables.

It has also a rigid control of ailerons and a special release system, allowing to drop instantly the gasoline tank in case of fire.

Its specifications are:

Motor—Spa-Ansaldo 6 cylinders, 220 hp.

Speed—145 miles per hour.

Climb—20,000 feet in 25 minutes.

Useful Load—550 lbs.

Normal Flight Endurance—3 hours.

Armament—Two fixed machine guns, firing through propeller.

The "Balilla" has been lately used on the Italian front and has many enemy planes to its credit.

The Spa-Ansaldo motor, used in the Sva and Balilla planes, is a vertical 6-cylinder, water-cooled engine of following specifications:

Power—210 hp. at 1600 r.p.m., 225 hp. at 1700 r.p.m.

Weight—(Including water), 550 lbs.

Drive—Direct from crankshaft.

Bore—135 millimeters (5 5/16).

Stroke—170 millimeters (6 11/16).

Gas Consumption—17.5 gallons per hour at full power; 16 gallons per hour at 1500 r.p.m.

Oil Consumption—6 lbs. per hour.

The Ansaldo Company of Genova, Italy, is one of the most important Italian concerns, having over $150,000,000 capital and 38 plants, employing over 100,000 persons.

Official List of Aircraft Exhibitors and Their Exhibits

Glenn L. Martin Company

Cleveland, Ohio

Exhibit—"The Martin Night Bomber"

Dimensions: Length, 46′ 0″; width, 7′ 0″; height, 14′ 0″; biplane panels; four-wheel landing gear.

Weights: Empty, 5,600 lbs.; gasoline supply, 285 gallons; crew, 4 men; bombs, 1,500 lbs.; gross load, 9,600 lbs.

Speed: Landing, 47 m.p.h.; maximum, 118.8 m.p.h.; climb, 10,000 feet in 21 minutes.

Motor: Two Liberty motors, each 400 h.p.; tractor propellers, direct drive.

Gallaudet Aircraft Corporation

East Greenwich, R. I.

Exhibit—Gallaudet "Chummy Flyabout"

Dimensions: Length, 18′ 7″; width, 33′ 0″; height, 5′ 0″; monoplane panels; two-wheel landing gear.

Weights: Empty, 750 lbs.; gasoline supply, 8 gallons; crew, 2 men; gross load, 1,080 lbs.

Speed: Landing, 45 m.p.h.; maximum, 85 m.p.h.

Motor: Two Indian motorcycle engines, each 18 h.p.; pusher propellers, transmission, and gear drive.

Exhibit—"Gallaudet D-4 Light Bomber Seaplane"

Dimensions: Length, 33′ 0″; width, 46′ 6″; height, 11′ 6″; biplane panels; single central pontoon.

Weights: Empty, 3,800 lbs.; gasoline supply, 64 gals.; crew, 2 men; bombs, 2 (400 lbs.); gross load, 5,430 lbs.

Speed: Landing, 45 m.p.h.; maximum, 130 m.p.h.; climb with bombs 8,100 feet in 15 minutes; without bombs, 7,700 feet in 10 minutes.

Motor: Liberty with patented Gallaudet pusher fuselage propeller.

Aeromarine Plane & Motor Company

Keyport, N. J.

Exhibit—Aeromarine—Model "50" Flying Boat

Dimensions: Length, 25′ 6″; width, 48′ 4″; biplane panels, hull.

Weights: Empty, 1,925 lbs.; gasoline supply, 35 gallons; crew, 3 men; gross load, 2,485 lbs.

Speed: Landing, 48 m.p.h.; maximum, 80 m.p.h.; climb, 2,400 feet in 10 minutes.

Motor: Aeromarine "L", 6 cylinder, 125 h.p.; pusher propeller, direct drive.

Cantilever Aero Company

1265 Broadway, New York

Exhibit—Christmas "Bullet" Type Mail Machine

Dimensions: Length, 19′ 6″; width, 28′ 0″; height, 7′ 6″; strutless biplane panels; two-wheel landing gear.

Weights: Empty, 1,600 lbs.; gasoline supply, 40 gallons; crew, 1 man; gross load, 1,925 lbs.

Speed: Landing, 55 m.p.h.; maximum, 197 m.p.h.; climb, 1,700 feet per minute.

Motor: One Hall-Scout, "Six"; 217 h.p.; tractor propeller, direct drive.

Wright-Martin Aircraft Corp.

New Brunswick, N. J.

Exhibit—"Loening" Military Monoplane

Dimensions: Length, 23′ 9″; width, 33′ 4″; height, 9′ 3″; monoplane panels; two-wheel landing gear.

Weights: Empty, 1,380 lbs.; gasoline supply, 54 gallons; crew, 2 men; gross load, 2,380 lbs.

Speed: Landing, 48 m.p.h.; maximum, 145 m.p.h.; climb, 16,000 feet in 16 minutes.

Motor: One Hispano-Suiza, "300 h.p."; tractor propeller, direct drive.

Mary Garden and Capt. Ugo D'Annunzio in the Dayton-Wright "Honeymoon Express"

Lewis & Vought Corp.

Long Island City

Exhibit—Model V E-7 "Bluebird"

Dimensions: Length, 24′ 2″; width, 34′ 3″; height, 8′ 7½″; biplane panels; two-wheel landing gear.

Weights: Empty, 1,365 lbs.; useful load, 630 lbs.; crew, 2 men; gross load, 1,995 lbs.

Speed: Landing, 48 m.p.h.; maximum, 110 m.p.h.; climb, 10,000 feet in 12 minutes.

Motor: Model "A" Hispano-Suiza, 150 h.p.; tractor propeller, direct drive.

United States Army, Aviation Section

Exhibit—S E-5 A Combat or Scout Aeroplane

(Built by the Curtiss Aeroplane & Motor Corporation)

Dimensions: Length, 21′ ½″; width, 26′ 9″; height, 10′ 0″; biplane panels; two-wheel landing gear.

Weights: Empty, 1,550 lbs.; gasoline supply, 37 gals.; crew, 1 man; gross load, 2,080 lbs.

Speed: Landing, 50 m.p.h.; maximum, 120 m.p.h.; climb, 10,000 feet in 12 minutes.

Motor: One 150 Hispano-Suiza; tractor propeller, direct drive.

Dayton-Wright Airplane Company

Dayton, Ohio

Exhibit—Model "T-4"—"Messenger Plane"

Dimensions: Length, 17′ 6″; width, 19′ 3″; height, 6′ 1″; biplane panels; two-wheel landing gear.

Weights: Empty, 476 lbs.; gasoline supply, 12 gallons; crew, 1 man; gross load, 730 lbs.

Speed: Landing, 40 m.p.h.; maximum, 78 m.p.h.; climb, 3,000 feet in 10 minutes.

Motor: One four cylinder Palmer engine, 37 h.p. at 2,000 r.p.m.; tractor propeller, direct drive.

Exhibit—D H-4 Battleplane

Dimensions: Length, 31′ 1½″; width, 42′ 5½″; height, 11′ 9″; biplane panels; two-wheel landing gear.

Weights: Empty, 2,475 lbs.; gasoline supply, 88 gallons; crew, 2 men; gross load, 3,800 lbs.

Speed: Landing, 58 m.p.h.; maximum, 122 m.p.h.; climb 10,000 feet in 10 minutes.

Motor: One Liberty, high compression, 400 h.p.; tractor propeller, direct drive.

Exhibit—Model D 4 K—"The Honeymoon"

Dimensions: Length, 31′ 1½″; width, 42′ 5½″; height, 11′ 9″; biplane panels; two-wheel landing gear.

Weights: Empty, 2,400 lbs.; gasoline supply, 88 gallons; crew, 3 men; gross load, 3,410 lbs.

Speed: Landing, 53 m.p.h.; maximum, 115 m.p.h.; climb, 10,000 feet in 10 minutes.

Motor: One "Liberty", high compression, 400 h.p.; tractor propeller, direct drive.

Exhibit—Model of the "Limousine" Type

Curtiss Aeroplane and Motor Corp.

52 Vanderbilt Avenue, New York City

Exhibit—Curtiss Model J N 4 D-2

Dimensions: Length, 27′ 4″; width, 43′ 7⅜″; height, 9′ 10⅝″; biplane panels; two-wheel landing gear.

Weights: Empty, 1,580 lbs.; gasoline supply, 21 gallons; crew, 2 men; gross load, 2,130 lbs.

Speed: Landing, 45 m.p.h.; maximum, 75 m.p.h.; climb, 3,000 feet in 10 minutes.

Motor: One Curtiss "OX-5", 90 h.p.; tractor, propeller, direct drive.

Exhibit—Curtiss Model "M F" Flying Boat

Dimensions: Length, 28′ 10¼″; width, 49′ 9⅜″; height, 11′ 9⅜″; biplane panels; hull.

Weights: Empty, 1,796 lbs; gasoline supply, 40 gallons; crew, 2 men; gross load, 2,430 lbs.

Speed: Landing, 45 m.p.h.; maximum, 69 m.p.h.; climb, 5,000 feet in 27 minutes.

Motor: One Curtiss "OXX", 100 h.p.; pusher propeller, direct drive.

Exhibit—Curtiss H. A. Hydroaeroplane

Dimensions: Length, 30′ 9″; width, 36′ 0″; height, 10′ 7″; biplane panels; simple central pontoon.

Weights: Empty, 2,638 lbs.; gasoline supply, 85 gallons; crew, 2 men; gross load, 3,650 lbs.

Speed: Landing, 62 m.p.h.; maximum, 130 m.p.h.; climb, 855 feet in 10 minutes.

Motor: One Liberty "12", low compression, 330 h.p.; tractor propellers, direct drive.

Exhibit—Curtiss Model 18B—Details Withheld by U. S. Navy

United States Army, Aviation Section

Exhibit—Handley Page Bomber—Model 0-400

(Built by the Standard Aircraft Corporation)

Dimensions: Length, 62′ 10″; width, 100′ 0″; height, 22′ 0″; biplane panels; four-wheel landing gear.

Weights: Empty, 8,300 lbs.; gasoline supply, 400 gallons; crew, 5 men; gross weight, 14,700 lbs.

Speed: Landing, 48 m.p.h.; maximum, 93 m.p.h.; climb, 10,000 feet in 32 minutes.

Motors: Two "Liberty" motors, each 400 h.p.; tractor propellers, direct drive.

Packard Motor Car Company

Detroit, Mich.

Exhibit—Model—The "1-A" Packard

Dimensions: Length, 25′ 0″; width, 37′ 0″; height, 8′ 11″; biplane panels; two-wheel landing gear.

Weights: Empty, 1,520 lbs.; gasoline supply, 34 gallons; crew, 2 men; gross load, 2,167 lbs.

Speed: Landing, 42 m.p.h.; maximum, 102 m.p.h.; climb, 15,000 feet in 34.5 minutes.

Motor: One Packard "1-A", 8 cylinder; tractor propeller, direct drive.

Thomas-Morse Aircraft Corp.

Ithaca, N. Y.

Exhibit—Model "S-4-C"—Single Seater Scout

Dimensions: Length, 19′ 10″; width, 26′ 6″; height, 8′ 1″; biplane panels; two-wheel landing gear.

Weights: Empty, 940 lbs.; gasoline supply, 30 gallons; crew, 1 man; gross load, 1,330 lbs.

Speed: Landing, 45 m.p.h.; maximum, 97 m.p.h.; climb, 7,500 feet in 10 minutes.

Motor: One LeRhone, 80 h.p., air cooled rotary; tractor propeller, direct drive.

Exhibit—Model M B 3—Single Seater Fighter

Dimensions: Length, 19′ 0″; width, 26′ 0″; height, 8′ 0″; biplane panels; two-wheel landing gear.

Weights: Empty, 1,360 lbs.; gasoline supply, 65 gallons; crew, 1 man; gross load, 2,050 lbs.

Speed: Landing, 65 m.p.h.; maximum, 163.68 m.p.h.; climb, 10,000 feet in 4 minutes, 52 seconds.

Motor: One Hispano-Suiza, 300 h.p.; tractor propeller, direct drive.

Exhibit—Model "S6"—Tandem Two-Seater

Dimensions: Length, 20′ 8″; width, 29′ 0″; height, 8′ 10″; biplane panels; two-wheel landing gear.

Weights: Empty, 900 lbs.; gasoline supply, 20 gallons; crew, 2 men; gross load, 1,385 lbs.

Speed: Landing, 40 m.p.h.; maximum, 105 m.p.h.; climb, 8,000 feet in 10 minutes.

Motor: One LeRhone, 80 h.p. rotary; tractor propeller, direct drive.

Exhibit—Model "S 7"—"Social Seater"

Dimensions: Length, 21′ 6″; width, 32′ 0″; height, 9′ 0″; biplane panels; two-wheel landing gear.

Weights: Empty, 1,000 lbs.; gasoline supply, 20 gallons; crew, 2 men; gross load, 1,480 lbs.

Speed: Landing, 40 m.p.h.; maximum, 90 m.p.h.; climb, 6,700 feet in 10 minutes.

Motor: One LeRhone, 80 h.p. rotary; tractor propeller, direct drive.

L-W-F Engineering Corporation

College Point, L. I.

Exhibit—Model H S 2-L Flying Boat

Dimensions: Length, 38′ 6″; width, 74′ 19/32″; height, 14′ 10″; biplane panels; hull.

Weights: Empty, 4,220 lbs.; gasoline supply, 153 gallons; crew, 3 men; gross load, 6,500 lbs.

Speed: Landing, 45 m.p.h.; maximum, 80 m.p.h.; climb, 3,000 feet in 10 minutes.

Motor: One "Liberty" low compression, 330 h.p.; pusher propeller, direct drive.

(Continued on page 18)

Lighter-Than-Air Craft Attract Much Attention at the Exposition

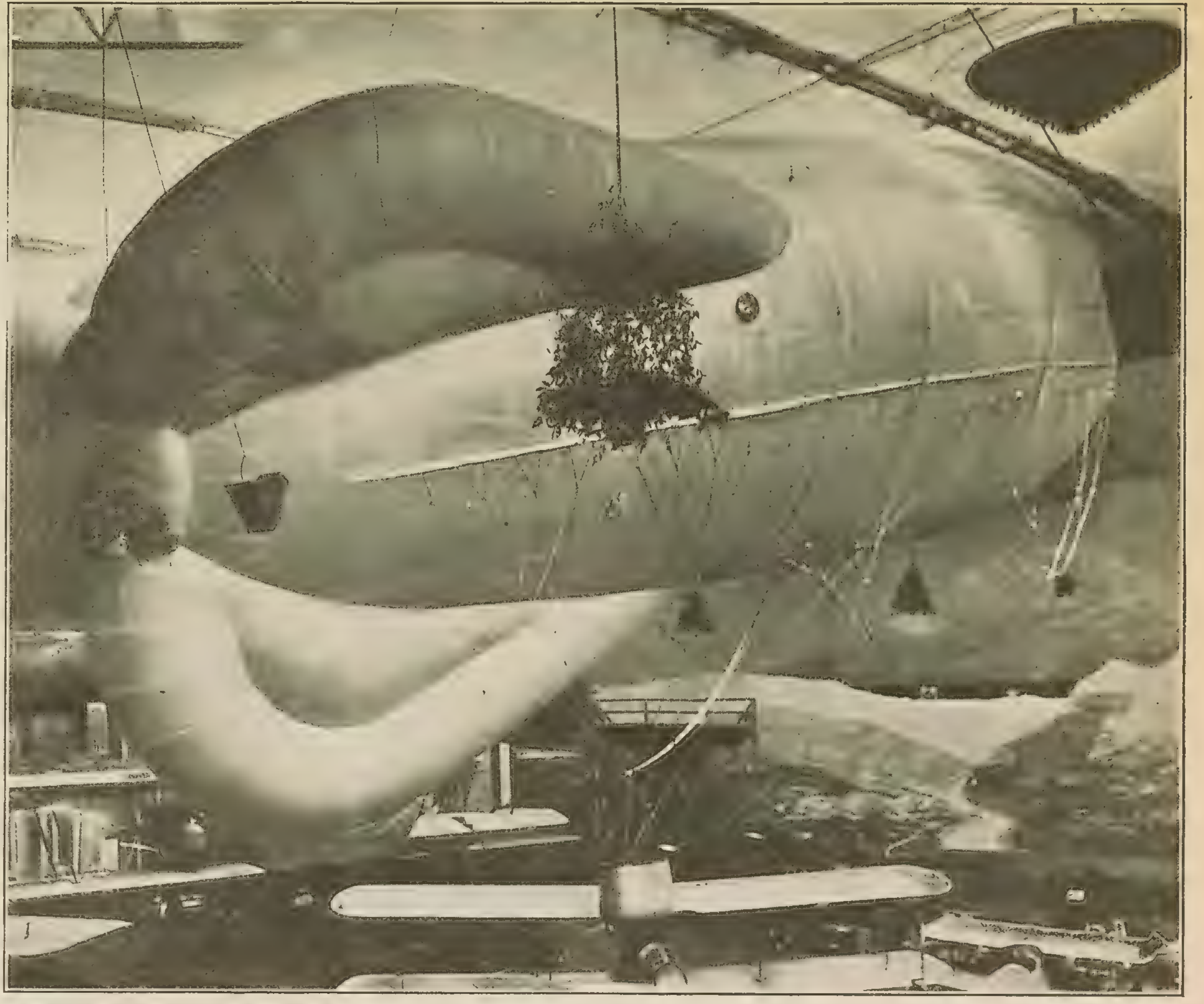
Goodyear Tire and Rubber Co.

The Goodyear Tire and Rubber Co., of Akron, Ohio., has for the past eight years been the leading manufacturer of aerostatic material in America. During this period over 800 lighter-than-air craft were produced by this firm, of which number thirty-four were airships, built for convoy and submarine patrol work with the naval forces, while others are now building.

When this country entered the war, the Navy placed an order for nine small non-rigid airships of the so-called Blimp type with the Goodyear Tire and Rubber Co., and subsequently additional orders were awarded this firm. The greater number of these airships had a capacity of from 77,000 to 95,000 cu. ft. and were fitted with Curtiss 100 hp., Thomas 150 hp., and Union Gas 120 hp. engines; the speed of these vessels varied from 45 to 55 m.p.h. Recently a much more powerful airship has been developed by the Goodyear Co for coast patrol work; this is the U-type known in the Navy as the C-class, which has a capacity of about 180,000 cu. ft and is driven by two 150 np. Hispano Suiza, or 120 hp. Union Gas engines, driving twin screws. The maximum speed of the Goodyear U-type is about 60 m.p.h.

All the Goodyear airships are notable for the finger patch type of suspension by which the car is secured to the envelope; this rigging permits the suppression of the heavy belly-band and its complicated rigging, and thus insures a great saving in weight. As to strength, each finger patch is tested to support a weight of 2,000 lb.; that is, the weight of the entire car, and since the latter is supported by a great number of such patches, a very high safety factor is insured. While the Blimp type of airship has been developed to cope with the submarine menace, this ship would make an ideal pleasure craft, since it can carry with great safety two or three persons at a speed of about 55 m.p.h. for about 8 hours.

The Goodyear exhibit comprises a one-half scale model of the U-type airship; a full size car of a 4-passenger airship of 25 hours endurance, which has been purchased by the U. S. Army; a reduced model of the passenger car of a 750,000 cu. ft. commercial airship to be built shortly; a full size Caquot kite balloon which is inflated with air and suspended from the roof of the Garden; and various parts and fittings, such as a 12 in. air damper valve, a finger patch, an Electric blower used on the Navy airships, etc.


Caquot Observation Balloon Built by the Goodyear Tire and Rubber Co.

Group of Noted Balloonists

From left to right—F. S. Lahm, veteran balloonist; Major C. J. McCoy, No. 1 Pilot; Col. A. L. Fuller, A. S. A., Chief of Balloon Service Training Section; Major H. L. Vaughn, A. S. A., a pioneer student; Col. J. Prentice, A. S. A., a pioneer student and oldest observer; Major E. Lazar, S. C., 1st Adjutant Omaha Balloon School and Lieut.-Col. H. S. Hersey, A. S. A., pioneer balloonist and Commanding Officer Omaha Balloon School.

The B. F. Goodrich Co.

The exhibit of the B. F. Goodrich Co. of Akron, Ohio, which is located in the 69th Regiment Armory, is highly representative of the important work accomplished by this firm in building up the lighter-than-air fleet of this country.

During the war the Goodrich Co. built seven non-rigid tractor airships of the Blimp type for the U. S. Navy; one of these vessels, which has seen 17 months of service with the naval forces, has been loaned by the Navy for the show and may be seen suspended from the roof of the 69th Regiment Armory. Nine airships of the twin engine coast patrol class are now being built for the U. S. Navy by the Goodrich Co.

Among the more notable exhibits there is a large assortment of various Gammeter valves, which are said by experts to be as gas-tight as it is humanly possible to make them, and interesting samples of a new type of patch developed by this firm for use on the large coast patrol airships. This so-called horseshoe patch probably distributes the stresses arising from the rigging of the car to the envelope in a more satisfactory way than has hitherto been achieved by various systems.

Another interesting exhibit is a moving picture show in which all the phases of the manufacture of lighter-than-air craft is displayed and thus contributes to the aeronautical education of the public.

Connecticut Aircraft Corp.

The Connecticut Aircraft Corp., of Bridgeport, Conn., which has the distinction of having built the first airship for the U. S. Navy, exhibits a 1/32 scale model of a passenger airship which is to displace 300,000 cu. ft. and carry 20 passengers at a speed of 60 m.p.h. This vessel is to be of the non-rigid type, with belly-band rigging; the engines, of a total horsepower of 400, are mounted in two separate engine nacelles, rigged forward and aft, while the passenger car is rigged amidships.

A full size free balloon, inflated with air, is suspended from the roof of the Garden, and scale models of a Caquot observation balloon and a free balloon are shown at the stand.

The Burgess Co.

The Burgess Co. of Marblehead, Mass., pioneer builders of heavier-than-air craft, exhibit in the 69th Regiment Armory a full sized car of a naval D-class airship. This car is 40 ft. long, and is fitted with two 120 hp. Union Gas engines, each driving a pusher airscrew; although the normal crew of these ships consists of four men, accommodations are provided for seven. A single seater cockpit is provided forward, for the coxswain controlling the rudder wheel; amidships there is a compartment for two, with the elevator wheel and the necessary instruments and controls, while aft a compartment is provided for the wireless operator, with a table for making notes, mapping, etc.

Ten cars of this model have been built by the Burgess Co. for the U. S. Navy, two of which are fitted with twin Union Gas engines, while the remainder are powered with two 150 hp. Hispano-Suiza engines each.

Liberty Engine Production

The total production of Liberty engines to Feb. 7 was 20,147, with 331 still to be delivered. Contracts for 30,526 of the motors were outstanding Nov. 11, but those for 23,622 were canceled.

L. W. F. GETS POST - OFFICE CONTRACT

To Change and Modify Twelve or More De H-4 Airplanes

FOR THE AIR MAIL SERVICE

Six Competitors in the Field with Bids Ranging from $41,815 to $17,554, the Successful One

Bids for changing and modifying twelve (12) DeHaviland 4 airplanes and as many more up to sixty (60) in lots of twelve, as the Postmaster may direct were opened February 26:

Bidder.	Price (each).	Total.
Curtiss Aeroplane & Motor Corp., Garden City, N. Y.	$1,975	$23,700
Aircraft Eng. Co., New York City, N. Y.	3,484.65	41,815
Witteman-Lewis Aircraft Co., Newark, N. J.	3,400	40,800
L-W-F. Eng. Corp., College Point, N. Y.	966.50 1,462	11,958 17,554
Continental Aircraft Co., New York City, N. Y.	2,325	27,900
West Virginia Aircraft Co., Wheeling, W. Va.	1,830	21,960

The contract was awarded to the L.-W.-F. Engineering Co. Its alternative bid, $1,462—which will probably be accepted—includes new lines, the stretching and testing of all wires; and the substitution of a nickel-steel landing device in lieu of the wooden one now used.

S V A Airplane Shown by Gio Ansaldo & Co.

Book on Motor Trouble Shooting

A pamphlet on Motor Trouble Shooting, issued by the Training Section, has been sent to the various flying fields for the use of pilots in cross-country flying.

The compilation of this pamphlet stands to the credit of 2nd Lieut. Curtis C. Webb, Assistant Engineer Officer at Ellington Field, who did all the detailed work on it.

The pamphlet is a well-set-up pocket edition of about twenty pages—excellently printed and well laid out. Each "trouble" has a page to itself where it is diagnosed in itemized form. Directions for starting Hispano-Suiza and Liberty engines and a few general rules precede.

Travel Allowances For Aviation Purposes

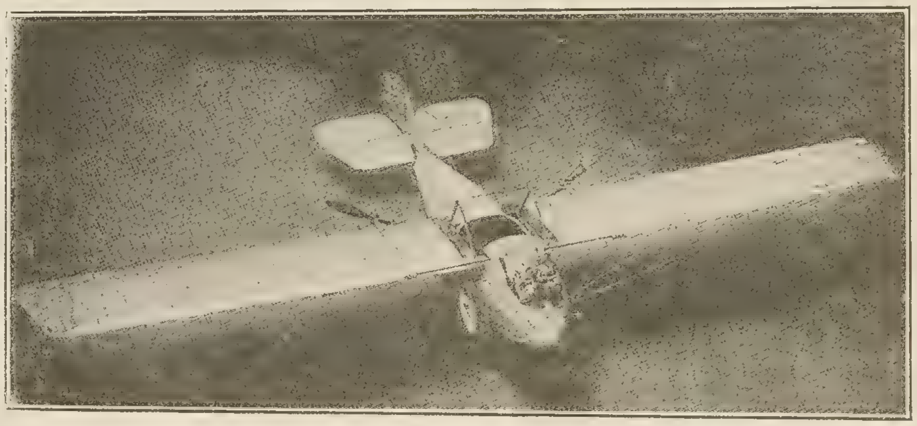
Section III of G.O. 22 W.D., February 6, 1919, amends Section III G.O. 81, W.D., 1918, as follows:

"Actual and necessary expenses, not exceeding $5 per day, may be paid from the Signal Corps appropriation of July 24, 1917, or from the Air Service appropriation of July 9, 1918, to officers, enlisted men, and civilian employees of the Army, and authorized agents when sent on special duty for aviation purposes at home or abroad under specific instructions from the Secretary of War."

It also announces that "Vouchers submitted for payment under the provisions of this order will be accompanied by an itemized statement of expenses."

It is to be noted that this change in General Orders has the effect of stopping reimbursement for expenses of any special duty for aviation purposes not authorized by the Secretary of War. Also, that actual expenses and not a per diem allowance will be paid, and that reimbursement will not be made for expenses in excess of $5 a day.

The officer in charge of Airship Training and Instruction at Akron, Ohio, is announced as Commanding Officer of a Balloon School, for the purpose of issuing travel orders in cases of officers returning from free balloon flights.



Gallaudet-" Chummy Flyabout "

Col. Truby Succeeds Gen. Lyster, Retired

Brig. Gen. Theodore C. Lyster, Chief of the medical section, D. M. A., was decorated with the D. S. M. Feb. 28, for service in connection with this section. He was retired on his own application the same day.

Col. A. E. Truby, U. S. Med. Corps, has been appointed to succeed Gen. Lyster, at the head of this section and assigned to duty on the staff of Gen. C. T. Menoher, Director of Air Service.

JN4-H Over 210 Hours in the Air

Ream Field boasts a JN4-H with a record of 210 hours and 20 minutes actual flying time without once having had its motor overhauled.

According to the Rockwell Field Weekly *Flight*, "this ship put in over 95 hours in combat work,—conceded to be the work placing the heaviest strain on a ship,—was mounted with a Marlin machine gun and used in tow target work and parachute drill, and answered in full every call on it without the mar of a single forced landing."

The chauffeur, one of Ream Field's best motor mechanicians who was in charge of the plane throughout its entire course, was given permission to make an exhaustive endurance test of it. It was generally conceded that the machine was good for thirty or forty more hours, but the officers in authority decided that it should be stripped, the motor taken apart and photographed in detail and its history studied for the benefit of further motor construction.

Discharges from the Air Service

The following Officers of the Air Service have been honorably discharged:

February 17: Major Charles S. Jackson; Second Lieuts. Thomas H. Owen, William T. Ashby.

February 20: Lieut.-Col. Harold Benington; First Lieuts. David R. Danner, Howard A. Scholle.

February 21: Second Lieut. Donovan L. Shaw.

February 24: Capt. Douglas Campbell.

February 25: First Lieut. Lionel E. Drew; Second Lieut. Harry B. Campbell.

February 26: Second Lieut. Harold W. Quirt.

February 11: Capts. George R. Howell, John A. Hambleton; Lieut.-Col. Philip A. Carroll; Second Lieut. Walter J. Smith.

February 12: Capts. John M. Holcombe, Jr., Richard H. Dixon, Jr.; First Lieuts. Carl L. Williford, John M. Galt, John C. Farrar.

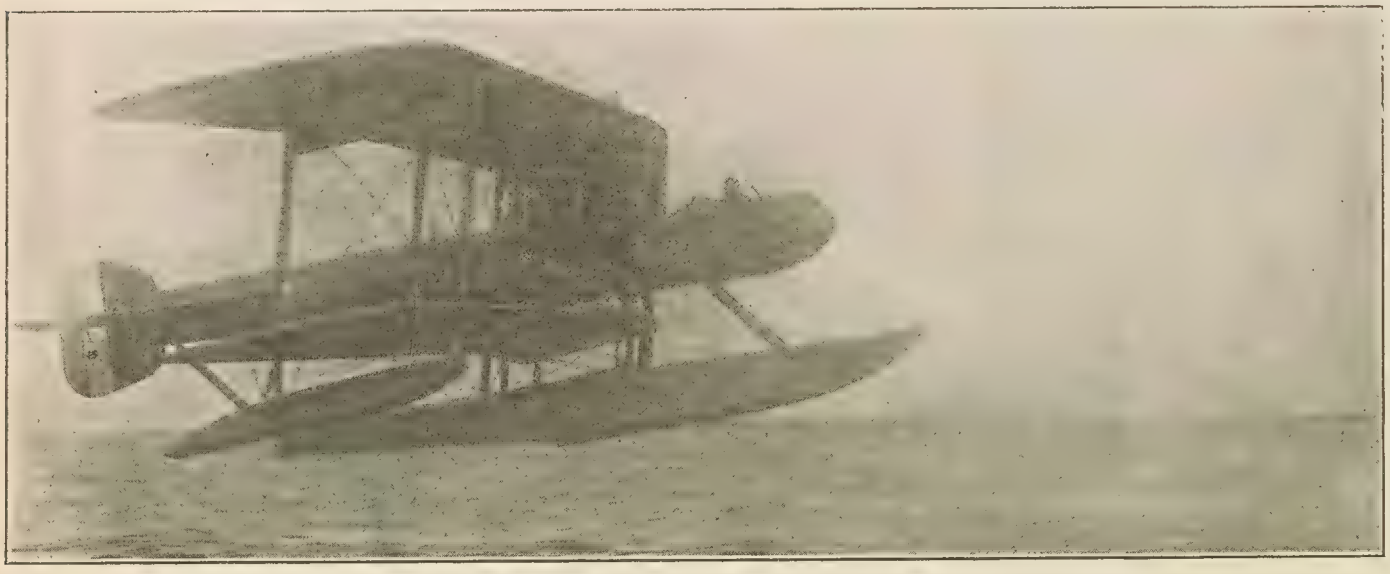
Lieut. Donaldson Declared an Ace

Lieut. J. O. Donaldson recently recommended for Military Aviator rating by the Division of Military Aeronautics' Rating Board, has been announced as an Ace "having brought down five planes officially noted as crashes and three officially out of control."

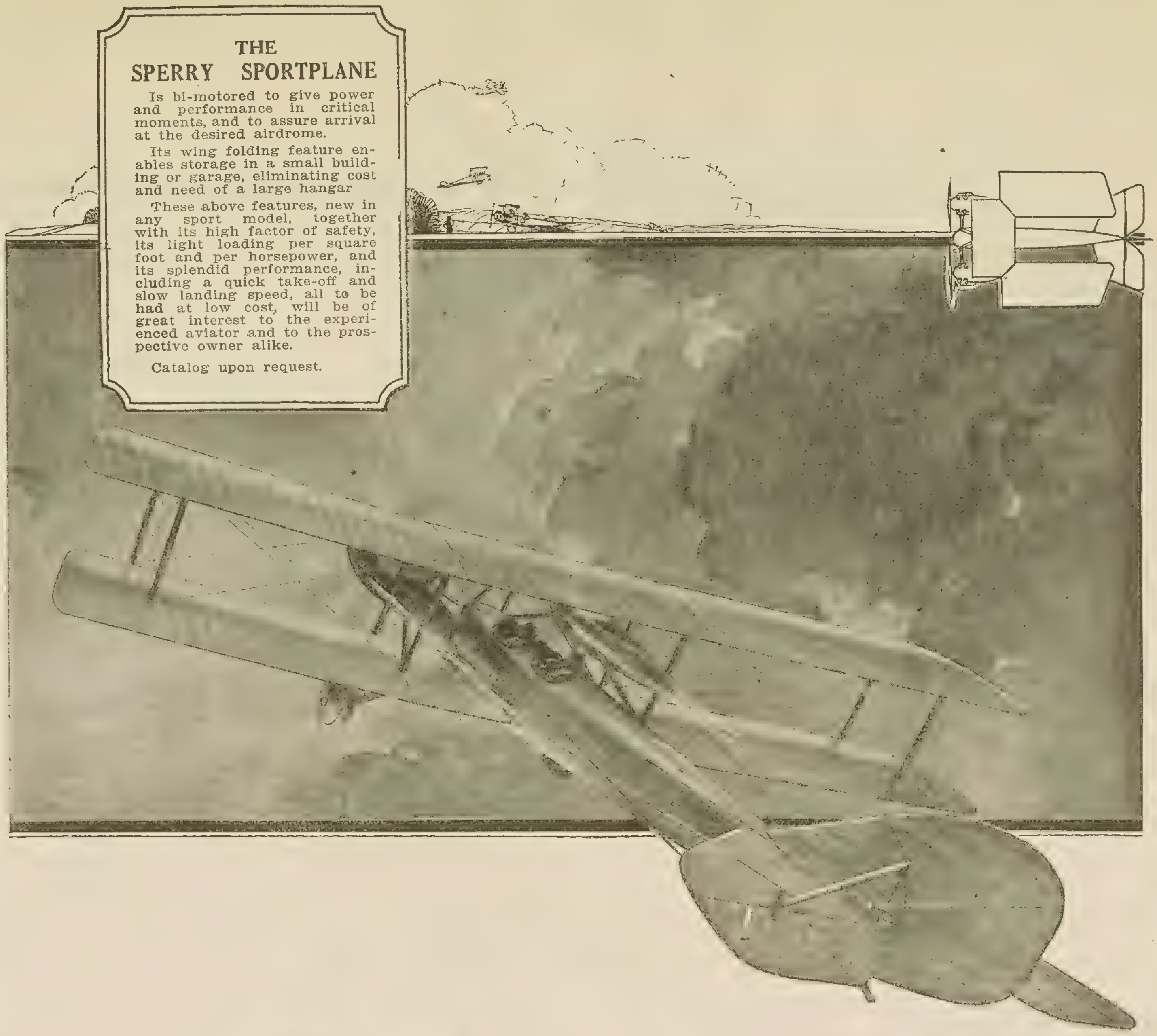
Lieut. Donaldson was not included in the first list of 63 Aces received from General Pershing; but, owing to recent confirmations from British Commands with which he flew, a positive record that he brought down at least five planes is now on file in the Air Service.

Lieut. Donaldson is a Washington man who took the Ground School Course at Cornell University and completed his flying training with the British. He was attached to a British Squadron when he was forced to land within the German lines. He was captured, but later escaped.

Lieut. Donaldson received the D. F. C. —the British Distinguished Flying Cross.



Gallaudet D-4 Light Bomber Seaplane



THE
SPERRY SPORTPLANE

Is bi-motored to give power and performance in critical moments, and to assure arrival at the desired airdrome.

Its wing folding feature enables storage in a small building or garage, eliminating cost and need of a large hangar

These above features, new in any sport model, together with its high factor of safety, its light loading per square foot and per horsepower, and its splendid performance, including a quick take-off and slow landing speed, all to be had at low cost, will be of great interest to the experienced aviator and to the prospective owner alike.

Catalog upon request.

The W. B. B. Aeromotor

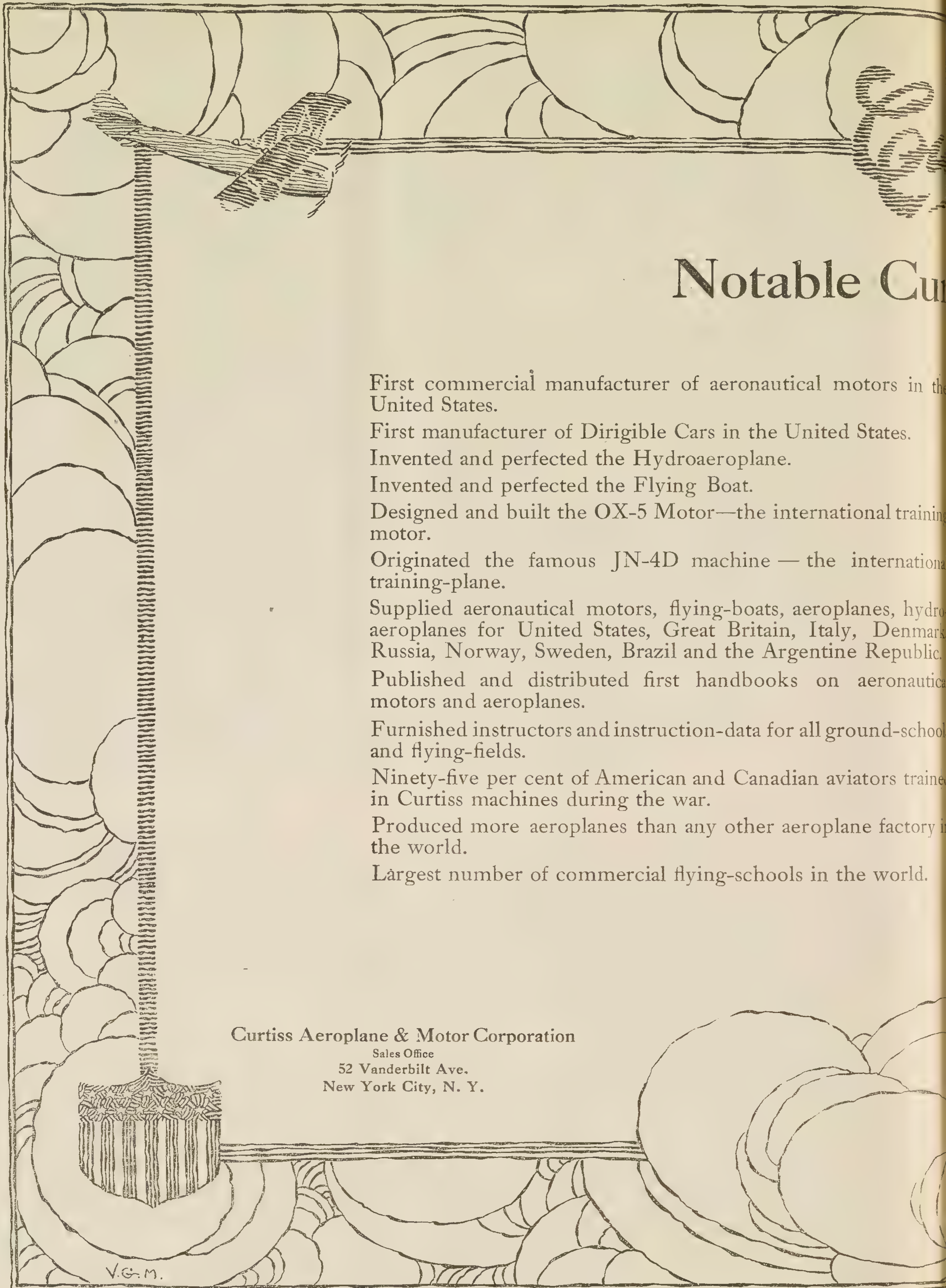
WE are ready to fill single or quantity orders for this remarkable little motor which is the product of investigation and development thruout the war.

It is a four cylinder, V type, air-cooled 129¾ pound motor developing 38 horsepower.

Besides our exhibit at the Aero Show, we will demonstrate, by appointment at a place convenient to the Show, its simplicity of installation and upkeep and its reliability of operation.

LAWRENCE SPERRY
President
THEODORE ARTER
General Manager

THE LAWRENCE SPERRY AIRCRAFT COMPANY.
FARMINGDALE, LONG ISLAND



Notable Cu

First commercial manufacturer of aeronautical motors in th United States.

First manufacturer of Dirigible Cars in the United States.

Invented and perfected the Hydroaeroplane.

Invented and perfected the Flying Boat.

Designed and built the OX-5 Motor—the international trainin motor.

Originated the famous JN-4D machine — the internationa training-plane.

Supplied aeronautical motors, flying-boats, aeroplanes, hydr aeroplanes for United States, Great Britain, Italy, Denmark Russia, Norway, Sweden, Brazil and the Argentine Republic.

Published and distributed first handbooks on aeronautica motors and aeroplanes.

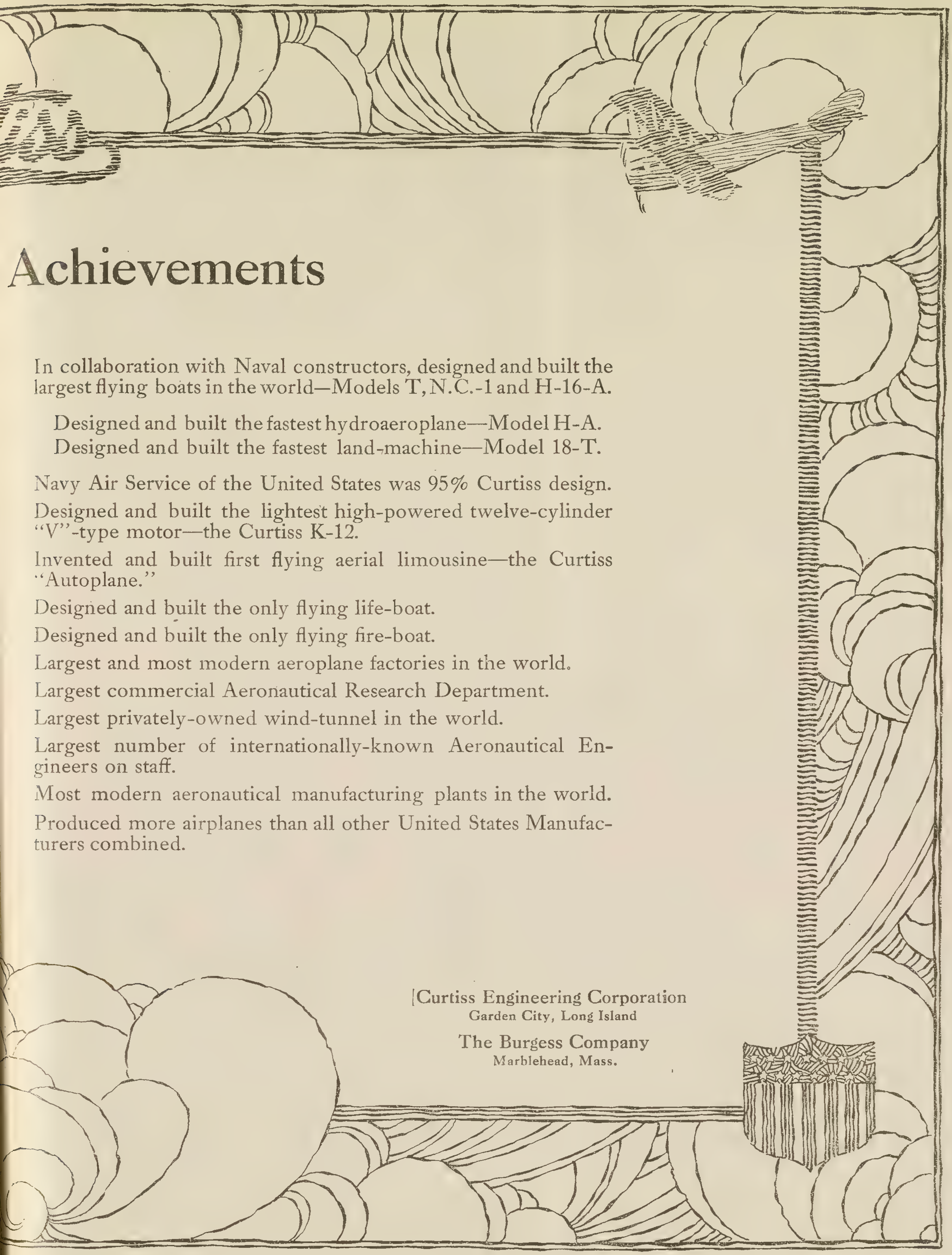
Furnished instructors and instruction-data for all ground-schoo and flying-fields.

Ninety-five per cent of American and Canadian aviators traine in Curtiss machines during the war.

Produced more aeroplanes than any other aeroplane factory i the world.

Largest number of commercial flying-schools in the world.

Curtiss Aeroplane & Motor Corporation
Sales Office
52 Vanderbilt Ave.
New York City, N. Y.



Achievements

In collaboration with Naval constructors, designed and built the largest flying boats in the world—Models T, N.C.-1 and H-16-A.

Designed and built the fastest hydroaeroplane—Model H-A.
Designed and built the fastest land-machine—Model 18-T.

Navy Air Service of the United States was 95% Curtiss design.

Designed and built the lightest high-powered twelve-cylinder "V"-type motor—the Curtiss K-12.

Invented and built first flying aerial limousine—the Curtiss "Autoplane."

Designed and built the only flying life-boat.

Designed and built the only flying fire-boat.

Largest and most modern aeroplane factories in the world.

Largest commercial Aeronautical Research Department.

Largest privately-owned wind-tunnel in the world.

Largest number of internationally-known Aeronautical Engineers on staff.

Most modern aeronautical manufacturing plants in the world.

Produced more airplanes than all other United States Manufacturers combined.

[Curtiss Engineering Corporation
Garden City, Long Island

The Burgess Company
Marblehead, Mass.

Balloon Activities at the Flying Circus

The 64th Balloon Company, Capt. E. P. Phillips in command, traveled from Arcadia to Rockwell Field on February 1 using its own transportation. The start was made at 7 A. M., and Rockwell Field was reached at midnight the same day. The next morning the balloon was inflated and made ready for the air. The long trip, and the rapid preparation for flight and observation gave an excellent idea of the mobility and training of a balloon company.

During the circus the balloon was the target of a dummy attack by several airplanes. After the balloon had been "hit with incendiary bullets" the observers, Captain Phillips and Lieutenant Burt, made parachute jumps. This demonstrated the only manner in which a balloon observer may save himself if his balloon is set afire. The contemplated use of helium gas instead of hydrogen will enable the observer to be armed with an automatic rifle and will insure him against the danger of fire.

Lieuts. Welch, McFayden, Cameron, Mooney, Hahlbeck, and Whistler all made successful parachute jumps. Lieut. R. K. Lloyd caused quite a sensation by making a drop in a basket parachute.

Zenith Carburetor Co. Exhibits
Top Row from Left to Right—55GD, 06DS Sectional, L8A,48DC
Bottom Row from Left to Right—65TE, US52, US52 Sectional, US52 Cut-away and 58DC

Zenith Carburetor Co.

The Zenith Carburetor Co., of Detroit, Mich., which, with its French, English, Italian and American factories, supplied a large majority of the carburetor equipment for the Allied Air Forces, have an exceedingly interesting and instructive exhibit in Space Nos. 101, 102 and 103 on the elevated platform at Madison Square Garden during the Aeronautical Exposition.

The Zenith Company supplied all the carburetor equipment for Liberty Engines and their product was also used on such other engines as Hispano Suiza, Curtiss, Renault, Lorraine Deitrich, Salmson, Anzani, etc., etc., Their carburetor exhibit will consist of the following models:

US52—Used on Liberty 12 Cylinder Aircraft Engines.

US52 in section, exposing the jets, fuel and air passages, etc, so that its principle of operation may be easily explained and grasped.

US52 cut away so that the action of the altitude correcting device can be clearly seen.

48DC—(French design but American built) used on 150 H.P. Hispano Suiza.

58DC—(French built) used on 220 H.P. and 300 H.P. Hispano Suiza.

65TE—(French built) used on Salmson Radial engine.

55GD—This is the latest development in Zenith aeronautical carburetors, it having been approved and accepted after careful and thorough tests for the 8-cylinder Liberty Engine. It was later to have replaced the US52 on the 12 cylinder engine. The signing of the armistice stopped all work on this and it was never actually put into production although quite a few were manufactured to be used on the 8-cylinder engines completed.

L8A—Used on Hall Scott 4-cylinder engine, and now used on Union Gas Engine Company's aeronautical engine.

O6DS—Used on Curtiss OX and OXX engines.

O6DS—Sectional model showing all parts and operation.

The Zenith Company also have a very interesting and instructive booklet descriptive of the Liberty Engine and of the Liberty Engine Carburetor. The operation of the carburetor is carefully and clearly explained, some data on the Liberty Engine is set forth and there are some very interesting photographs. These pictures include views of the carburetor, of the Liberty Engine, of the first plane in which a Liberty Engine was mounted, an L.W.F. specialy built for the purpose; the testing outfit used on Pikes Peak, etc. These will be distributed on request at the Exposition.

Zenith Carburetor Company representatives at the Exposition are: V. R. Heftler, President and General Manager; V. I. Shobe, Asst. General Manager; L. A. Pratt, Advertising Manager; R. H. Taylor, New York Branch Manager; C. C. Sands, Road Engineer.

Air Transportation Company Formed

An aerial company recently has been organized in Fort Worth, Texas, for the purpose of carrying passengers and instructing pupils.

The officers, pilots and mechanics of the company are ex-army men who have been in the Air Service of the country. It is proposed to operate from Fort Worth as a base and to fly to adjacent oil fields and return in three hours.

The officers are: R. H. Pearson, Pres.; K. C. Braymen, Vice-Pres.; M. P. Colvin, Trustee and D. H. McClure, Flight Manager.

ROYAL FLYING CORPS
CANADIAN TRAINING PLANES

EQUIPPED WITH 90 H.P. O X 5 ENGINES
IN FIRST CLASS FLYING CONDITION

Are Available for

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52 VANDERBILT AVENUE TELEPHONE: VANDERBILT 4324 NEW YORK
CABLE ADDRESS, "UNAIRCO"

Spares and Supplies Available at All Times from Our Permanent New York Warehouse

Opening of the Show

(Continued from page 1)

cans had brought down German planes in proportion of four and one-half to one over our planes forced down by the enemy.

Another army man who came shortly after General Mitchell was Lieut.-Col. A. B. Hersey, who, though he is over sixty years old, taught American balloonists the ease and safety of parachute jumping.

The Garden was fitted with elaborate scenic effects to represent a landing field at the edge of the far-reaching mountainous landscape which featured a sky dotted with aircraft.

Army Day

Monday was Army Day at the show. Secretary Baker, who was to have been present, was detained in Washington, but the following officers were there: Gen. Thomas H. Barry, commanding the Department of the East, Governor's Island; Gen. Daniel G. Shanks, of the Port of Debarkation, Hoboken; Gen. T. A. Bingham, Col. A. M. Miller, Col. G. E. Harris, Col. William Stephenson, Col. R. S. Smith, Col. P. S. Bradlee, Col. S. D. Greene, Col. C. G. Wallace, Major John McClintock, Capt. E. H. Quigley and Capt. W. A. Simpson.

Great Britain was represented by Gen. L. E. O. Charlton, British Air Attache at Washington, and Gen. Guy Livingstone; France by Capts. L'Dhouille and Des Fourmastroux, and Italy by Captain Tappi, chief of the Italian Military Mission to the United States.

First Wright Machine Arrives

The original Wright machine—the queer looking plane that made the first sustained man carrying and engine driven flight of heavier than air machine—arrived Tuesday at the show after a hard battle with reluctant railroads and will be part of the show by this afternoon. This is the plane which on December 15, 1903, at Kitty Hawk, N. C., flew 852 feet in 59 seconds. With it were James M. Jacobs, who helped the Wright brothers build their first machine, and Howard M. Rinehart, a pioneer Wright pilot.

Details of the recent test flight of the Thomas-Morse Air Corp. one seated fighting plane in which the ship made 183 miles with and 145 miles an hour against the wind were made public Tuesday. The test was made over a course of one-half mile at Ithaca in the presence of army officers, who credited the machine with a speed in still air of nearly 164 miles an hour, an unofficial world's record. The plane, which mounts two machine guns firing through the propeller, is driven by a 300 horsepower Hispano Suiza motor and was piloted by Frank H. Burnside. A feature of the plane is its extremely low resistance to the wind and a radiator which is built right into the upper wing. It was designed by B. D. Thomas. The army has ordered several of the scouts, and further tests will be made shortly.

Following are the officers of the Manufacturers' Aircraft Association: Frank H. Russell, president; Albert H. Flint, vice-president Benj. S. Foss, secretary; H. B. Mingle, treasurer, and S. S. Bradley, assistant treasurer and general manager.

The Show Committee consisted of: Inglis M. Uppercu, chairman; Albert H. Flint, H. B. Mingle, Fay L. Faurote, G. M. Williams, B. A. Guy, manager, and Luther K. Bell, Director of Publicity.

Elsewhere in this issue of the Air Service Journal many of the leading exhibits are fully described.

Splitdorf Electrical Co.

This exhibit consists of a full line of ignition devices for Airplane Engines.

The company's representatives are: C. W. Curtiss, General Manager; F. C. Manning, General Sales Manager; H. W. School, Sales Eng.; D. R. Walls, Adv. Mgr.; W. J. Hart, Eng.; C. T. Mason, Chief Eng.; E. A. Robertson Eng. Dept. and M. E. Toepel, Technical Dept.

U.S.

U. S. Letters for collar insignia as prescribed by General Orders No. 74

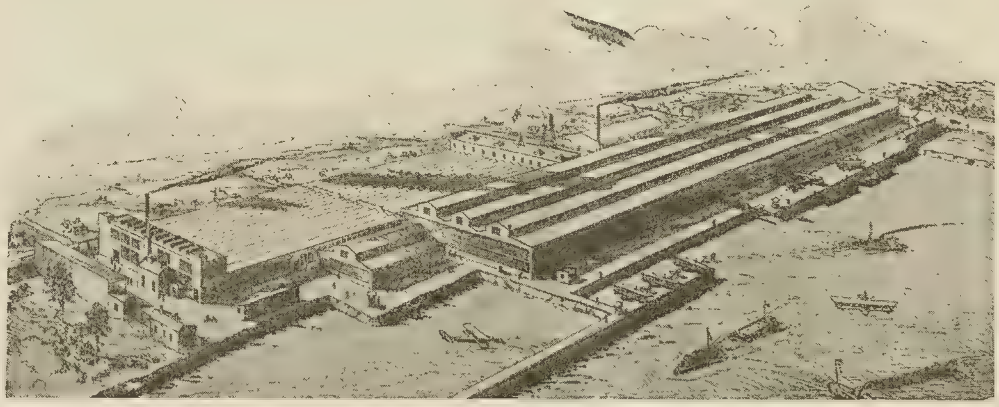
FOR ALL OFFICERS OF THE UNITED STATES ARMY

Bronze of best quality with safety catch, 60 cents per set; without safety catch, 50 cents per set. Ready for immediate shipment.

The official standard samples on file with the War Department were manufactured by this Company.

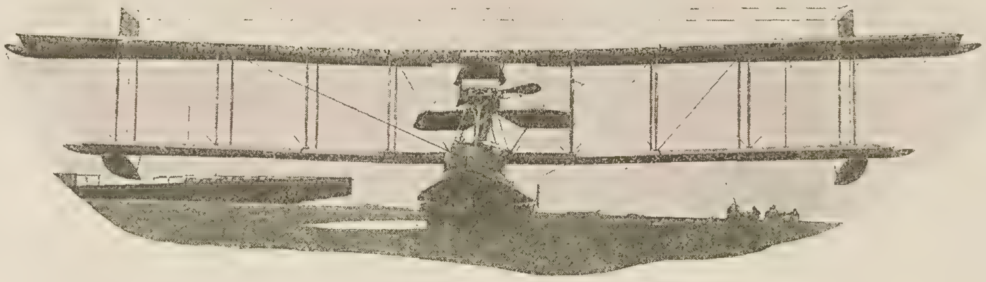
Bailey, Banks & Biddle Co.
PHILADELPHIA, PA.

Thomas
THOMAS-MORSE AIRCRAFT CORPORATION
CONTRACTORS TO THE U.S. GOVERNMENT
ITHACA, N.Y. U.S.A.



Floor Space, 250,000 Square Feet

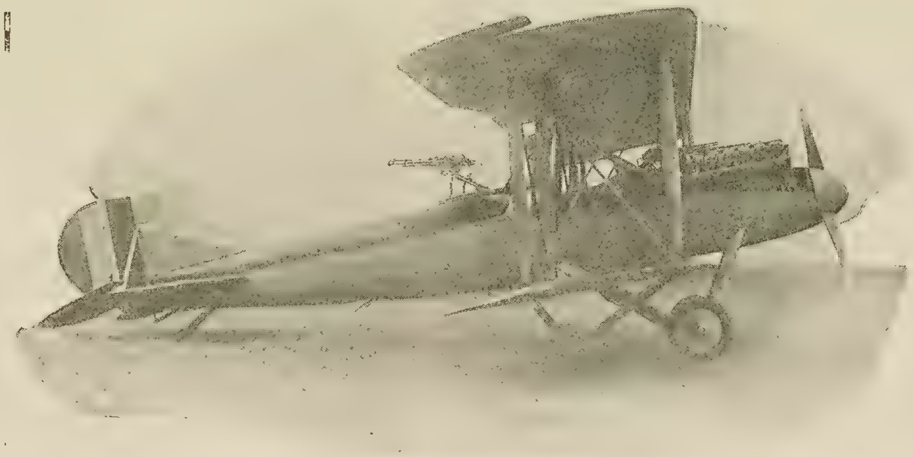
Aircraft Plant at College Point, Long Island



Flying Boat

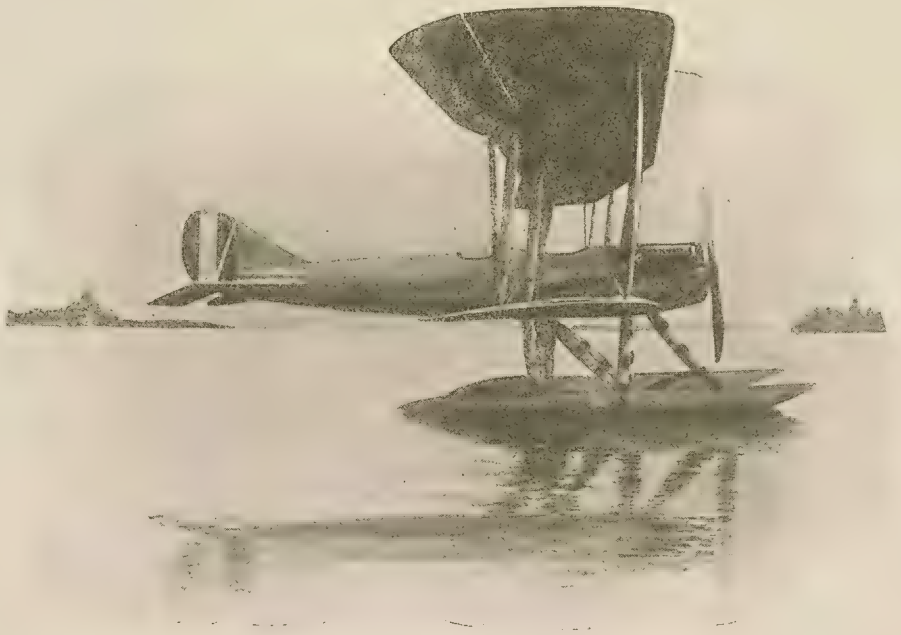
On Exhibition at the Aeronautical Exposition

L·W·F ENGINEERING COMPANY
Inc.
COLLEGE POINT, L. I.



Model G-3 Fighting Bomber

On Exhibition at the Aeronautical Exposition



Model VH-1 Seaplane

On Exhibition at the Aeronautical Exposition

L·W·F ENGINEERING COMPANY
Inc.
COLLEGE POINT, L. I.

Official List of Exhibits

(Continued from page 8)

Boeing Airplane Company

Seattle, Wash.

Exhibit—Model "C-L-4-S" Hydroaeroplane

Dimensions: Length, 27′ 0″; width, 43′ 6″; height, 12′ 7″; Biplane panels; twin pontoons.
Weights: Gasoline supply, 31.5 gallons; crew, 2 men; gross load, 2,430 lbs.
Speed: Landing, 38 m.p.h.; maximum, 75 m.p.h.; climb, 3,600 feet in 10 minutes.
Motor: Hall-Scott Liberty four, 125 h.p.; tractor propeller, direct drive.

United States Navy (Naval Aircraft Factory)

Philadelphia, Pa.

Exhibit—Model F 5-L Flying Boat

Dimensions: Length, 49′ 4″; width, 103′ 9″; height, 18′ 9″; biplane panel; hull.
Weights: Empty, 8,250 lbs.; gasoline supply, 350 gallons; crew, 4 men; gross load, 13,000 lbs.
Speed: Landing, 50 m.p.h.; maximum, 87 m.p.h.; climb, 2,625 feet in 10 minutes.
Motors: Two "Liberty" low compression, each 330 h.p.; tractor propellers, direct drive.

Exhibit—"Loening Kitten"

Dimensions: Length, 13′ 0″; width, 18′ 0″; height, 5′ 0″; monoplane panels; twin pontoon landing gear.
Weights: Empty, 300 lbs.; gasoline supply, 10 gallons; crew, 1 man; gross load, 530 lbs.
Speed: Landing, 50 m.p.h.; maximum, 105 m.p.h.; climb, 1,500 feet in the first minute.
Motor: One 3 cylinder Lawrence, 60 h.p.; air cooled fixed; tractor propeller, direct drive.

Standard Aircraft Corporation

Elizabeth, N. J.

Exhibit—Model E-1

Dimensions: Length, 18′ 10″; width, 24′ 0″; height, 9′ 1″; biplane panels; two-wheel landing gear.
Weights: Empty, 869 lbs.; gasoline supply, 20 gallons; crew, 1 man; gross load, 1,188 lbs.
Speed: Landing, 48 m.p.h.; maximum, 103 m.p.h.; climb, 10,000 feet in 22.33 minutes.
Motor: One LeRhone motor, 80 h.p. rotary; tractor propeller, direct drive.

Exhibit—Model J R-1

Dimensions: Length, 26′ 2″; width, 31′ 4¾″ height, 10′ 10 3/16″; biplane panels; three-wheel landing gear.
Weights: Empty, 1,566 lbs.; gasoline supply, 60 gallons; crew, 1 man; gross load, 2,400 lbs.
Speed: Landing, 48 m.p.h.; maximum, 100 m.p.h.; climb, 5,300 feet in 10 minutes.
Motor: Model I Hispano-Suiza, 170 h.p.; tractor propeller, direct drive.

Gio. Ansaldo & Company

Genoa, Italy

Exhibit—"S. V. A." (Savoie Verduzio Ansaldo)

Dimensions: Length, 22′ 11″; width, 29′ 10″; height, 11′ 6″; biplane panels; two-wheel landing gear.
Weights: Empty, 1,900 lbs.; gasoline supply, 75 gallons; crew, 1 man; bombs, 150 lbs.; gross load, 2,900 lbs.
Speed: Landing, 45 m.p.h.; maximum, 140 m.p.h.; climb, 20,000 feet in 30 minutes.
Motor: S. P. A. Ansaldo, 6 cylinder, vertical, 220 h.p.; tractor propellers, direct drive.

Exhibit—"Ansaldo Primo"

Dimensions: Length, 19′ 8″; width, 22′ 11″; height, 11′ 6″; biplane panels; two-wheel landing gear.
Weights: Empty, 1,600 lbs.; gasoline supply, 40 gallons; crew, 1 man; gross load, 2,200 lbs.
Speed: Landing, 45 m.p.h.; maximum, 145 m.p.h.; climb, 20,000 feet in 25 minutes.
Motor: (Same as S. V. A. motor equipment.)

The Burgess Co.

Marblehead, Mass.

Exhibit—Burgess—Blimp Car (Nacelle)—Type "6" Dirigible

Dimensions: Length, 40′ 0″; width, 16′ 0″; height, 7′ 0″.
Weights: Empty, 3,800 lbs.; gasoline supply, 280 gallons; crew, 4 to 7.
Speed: Maximum, 68 m.p.h.
Motor: 2 Union gas engines, 6 cylinder, 120 h.p.; pusher propellers, direct drive.

Caproni Manufacturing Co.

Milan, Italy

Exhibit—Caproni Triplane Model "1915"

Dimensions: Length, 48′ 0″; width, 100′ 0″; height, 19′ 0″; triplane panels, eight-wheel landing gear.
Weights: Empty, 11,000 lbs.; gasoline supply, 300 gallons; crew, 5 men; bombs, 3,300 lbs.; gross load, 16,000 lbs.
Speed: Landing, 40 m.p.h.; maximum, 100 m.p.h.; climb, 5,000 feet in 15 minutes.
Motors: Three Liberty motors; propellers; outside, tractors and center, pusher; direct drive.

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The only regulation size sterling silver three piece insignia made in the U. S. A. For sale at all Exchanges

Insist on De Luxe Insignia

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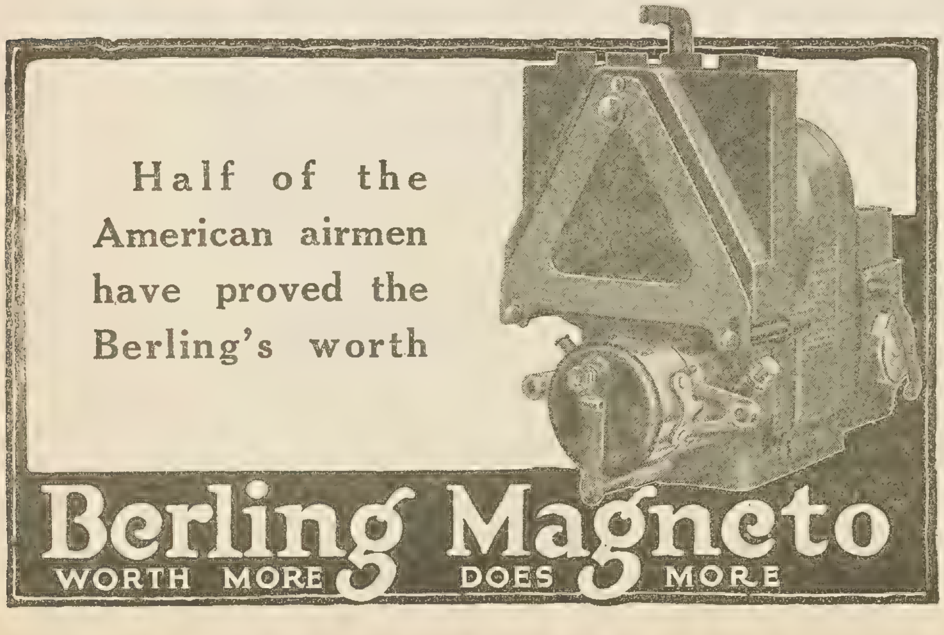
Half of the American airmen have proved the Berling's worth



The PENTZ COMPASS

May be seen on the Standard J-1 United States Mailplane in the 69th Regiment Armory

A 3-IN-1 INSTRUMENT

THE COMPASS THAT DOES NOT SPIN

PENTZ, VAN ALEN & DURKEE COMPASS CO.

4 West 37th Street, New York

Personals

Capt. Theodore Arter, who was stationed at Langley Field during the war as officer in charge of experimental flying, is now general manager of the Lawrence Sperry Aircraft Co.

C. A. Crimmins represents the J. W. Wood Elastic Web Co. of Stoughton, Mass., at the Exposition.

R. G. Ames has joined the Black & Decker Manufacturing Co. and becomes manager of the Baltimore Company's Chicago office.

Major Melvin A. Hall, A.S.A., is appointed a member of the Board of Officers created by Paragraph 3, Special Orders No. 28, Division of Military Aeronautics, February 1, 1919, to pass on the qualifications of flying officers who have distinguished themselves in action, with a view of awarding them such ratings as their achievements and abilities may warrant. Major Hall is appointed vice Col. Townsend F. Dodd, M.A., A.S.A., relieved.

Lieut.-Col. Bruce B. Buttler, A.S.A., has been ordered to report at Kelly Field, San Antonio, Texas, on March 15, for examination for rating as Junior Military Aviator.

The following-named Officers, having completed the required tests, are rated Reserve Military Aviators, to be effective from the dates set after their respective names: Second Lieuts. Warren E. Calvin, A.S.A., January 20, 1919; Cyril R. Davis, A.S.A., January 20, 1919, and John H. Matthews, A.S.A., February 7, 1919.

Rutgers Memorial for Roosevelt

A campaign for the establishment by the city of New Brunswick, N. J., of a Roosevelt Memorial in the form of the foundation of a chair of aeronautics at Rutgers College has been launched there. J. Ward and J. B. Meirick of the Standard Aircraft Corporation and H. O. C. Isenberg, factory manager of the Wright-Martin Aircraft Corporation's plant, are supporting the campaign.

The purpose of the course would be to train engineers for the devlopment of commercial aeronautics. Rutgers College is the State college of New Jersey, and already has important engineering courses and equipment.

Valentine & Co.

This exhibit is a French airplane propeller finished with Valspar varnish. By means of a small motor, it revolves, the blades of the propeller dipping alternately in the half moon tank of water. It shows the waterproofness and wearing qualities of Valspar.

The company also has reprints of advertisements which recently appeared in the aeronautical publications on exhibit.

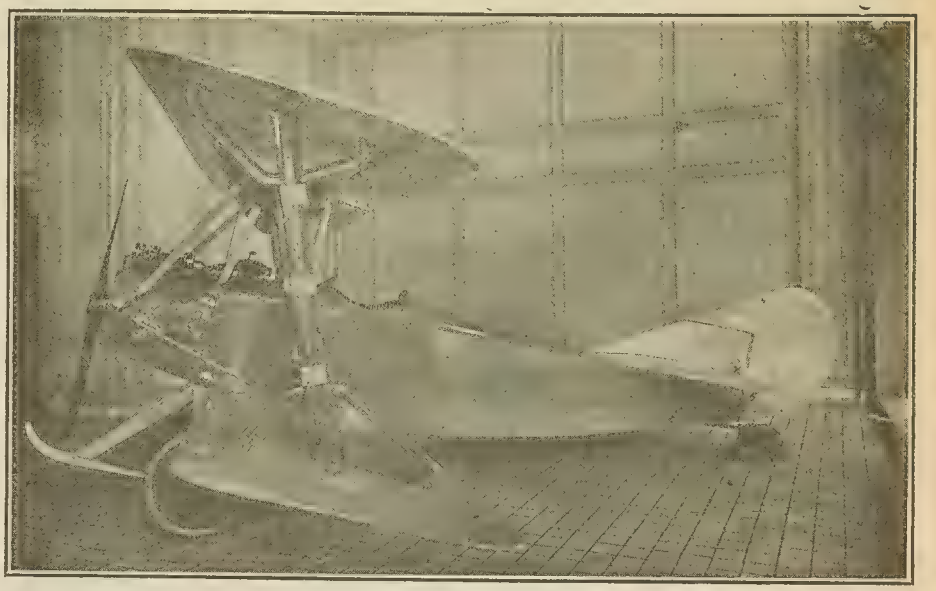
In addition there are panels and wing frames, showing various airplane materials.

The panels used in a test to determine the amount of absorption of pontoon enamels when submerged in water, are also on exhibit.

C. O. Thomas and W. J. Calhoun are in attendance at the booth. Both of these gentlemen have been in close connection with the airplane industry and are experts in the airplane finishing line.

Low in the cost of up-keep High in the factor of safety

IT IS AN ACE
$2500



A PRACTICAL AIRPLANE

Built by an organization skilled in aircraft production; for the man who loves the air regardless of the business that calls him. Ideal for the ranch owner, the pilot of the aero mail, the sportsman and the explorer. Sturdy in construction, capable of long and continued service.

"The Country Road Your Airdrome"

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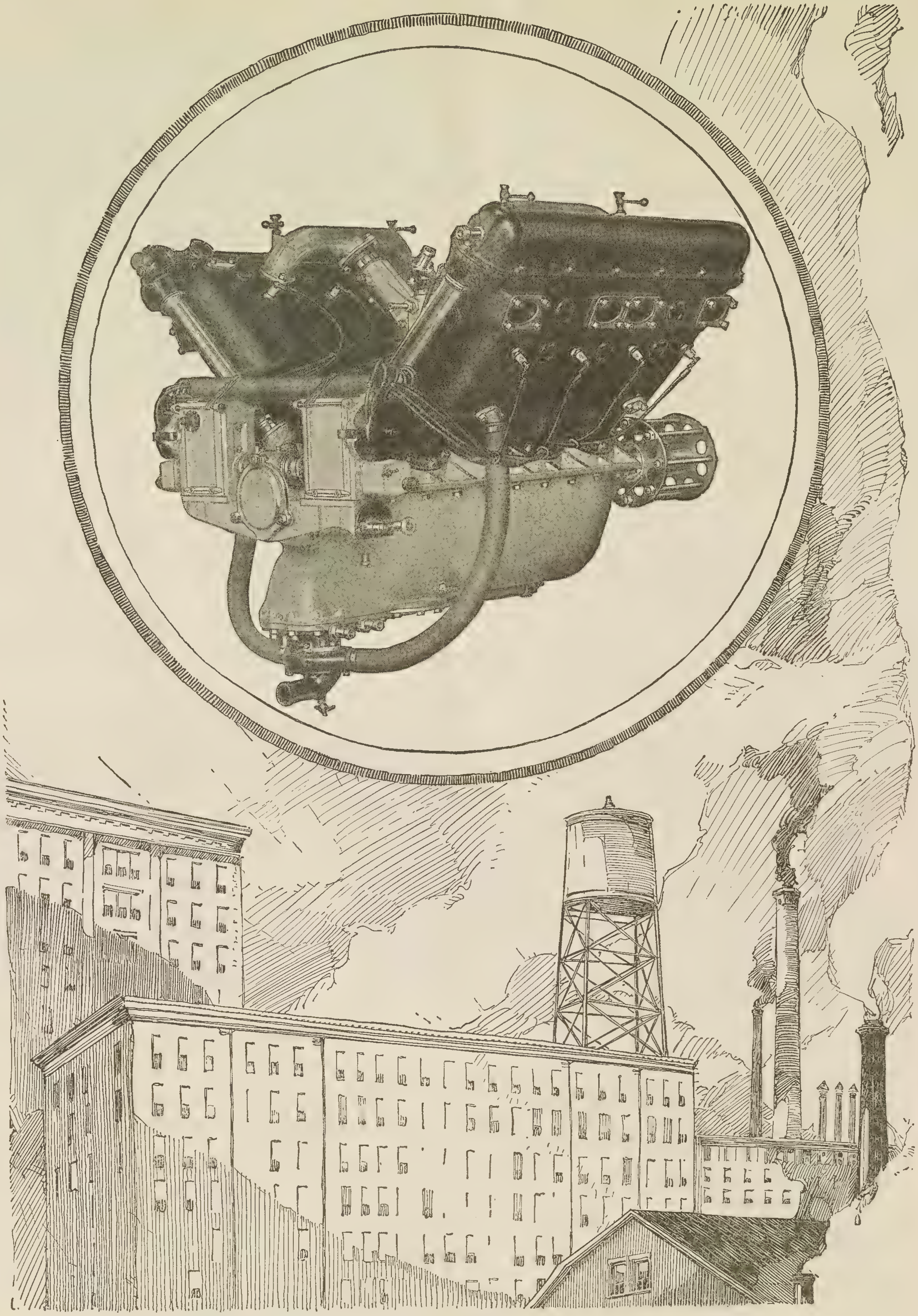
NEW YORK
Contractors to the United States Government

During the war 95% of Zenith production went to supply Zenith Carburetors to the Government. These were used on airplanes, on trucks, on gasoline locomotives, on balloon hoists, on lighting outfits, etc. *Wherever reliability, economy and efficiency were needed Zenith Carburetors were found.*

Zenith Carburetor Company, Detroit

(There are two Zenith Liberty Carburetors used on every Liberty Aircraft Engine produced—the reason is clear to Zenith users.)



AMERICAN Industry offers no finer example of efficiency than that behind the intensive production of the

HISPANO-SUIZA AIRCRAFT ENGINE

"The Motor that made the Spad possible"

for the war-time equipment of thousands of combat, pursuit and training 'planes, hydro's and dirigibles in the United States Government Air Program.

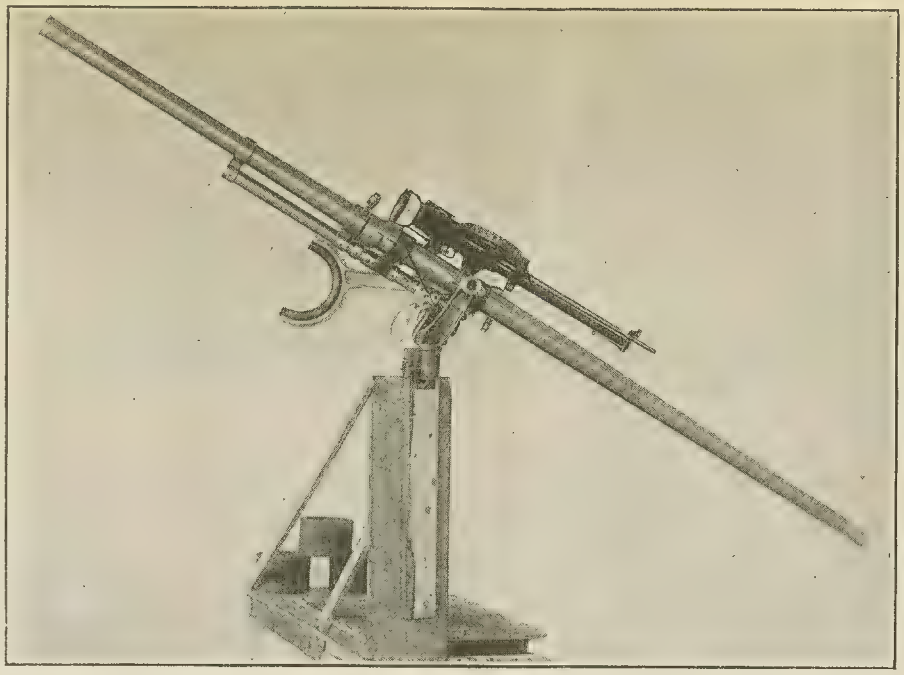
Manufactured by

Wright-Martin Aircraft Corporation
New Brunswick, N. J.

SECTIONS 4 and 5
MADISON SQUARE GARDEN
MARCH 1st to 15th

General Ordnance Company Exhibit

It is well known that large caliber guns of the ordinary type cannot be mounted on aeroplanes because of the recoil force, and further, that no accurage system has been developed for bomb dropping. To overcome these difficulties and provide guns of the larger caliber suitable for mounting on aeroplanes, the General Ordnance Company has designed and perfected the Davis non-recoil gun as illustrated in the above photographs. Two-pounder non-recoil guns have been supplied for mounting on aircraft for use against hostile aeroplanes and Zeppelins, and six-pounders for the same use, as well as against submarines on the surface. Service conditions, however, have demonstrated that the nine-pounder as shown in the photograph is the smallest gun which can be used to advantage against submarines when submerged, and as the destruction of the submarine was one of the primary objects of the United States Navy Department during the war, much stress has been laid upon the development of this particular size.



9 Pounder Davis Gun—Non Recoil No. 1

In lieu of a lengthy, technical description of this gun, we quote below an extract from the Secretary of the Navy's report for 1918, under the heading "Notable Achievements in Ordnance":

"A great milestone in aircraft armament was passed when the Bureau of Ordnance completed a successful Davis non-recoil aircraft gun. Not only has this gun passed experimental stages, but it is actually in operation on our seaplanes. Not only that, but naval experts are engaged in producing these guns of medium caliber in quantities so that within a very short space of time all naval aeroplanes requiring them will be armed with a 1½-inch or 2-inch cannon, which can be used either against hostile aeroplanes or submarines. The objection to using cannon on aeroplanes has been that the shock of the recoil was so strong that the aeroplane structure was unable to withstand it. The Davis non-recoil gun removes that objection, as it was developed primarily to overcome the difficulties encountered in dissipating the recoil forces incidental to the explosion of the propelling charge.

"In this gun the recoil force of the forward barrel is counter-balanced by that of a rear barrel from which a dummy charge is fired simultaneously with the projectile. The principle is not difficult to understand if we consider the explosive forces would counter-balance and little or no recoil shock would be transmitted to the mount. In other words, the Davis gun fires from both ends. It has no breech. The rear of the gun is left open as well as the muzzle. The propectile is fired from the muzzle of the gun and a heavy charge of fine shot fired from the rear of the gun, the propelling charge being directly between the two. The result is that the shock of recoil from firing the projectile and the shock of recoil from firing the fine shot exactly balance each other, and if the gun is mounted on an aeroplane it can be readily understood how the plane itself is relieved of enormous stresses.

"An interesting development in connection with the firing of the Davis gun is found in the substitution of a Lewis gun for the usual sighting purpose. This machine gun is mounted on the carriage of the Davis gun in such relation to the Davis gun that from a height at which antisubmarine attacks are usually made the bullets of the Lewis gun strike in the same place as the projectile from the Davis gun. In operating this combination the path made by the rapid splashes in the water informs the operator of his point of aim. When the Lewis gun bullet splashes reach the desired spot where the aeroplane pilot desires his Davis gun projectile to strike he pulls the trigger."

Davis non-recoil guns of larger calibers have been designed for different purposes, and in fact present aeroplanes are capable of carrying a 5 or 6-inch gun with sufficient muzzle velocity to penetrate the protective decks of any battleships.

AMMUNITION

The standard projectile will not travel straight under water, and in order to hit a submarine when submerged, it has been necessary to perfect a special non-ricochet or antisubmarine shell. This shell as designed and perfected by the General Ordnance Company will be exhibited in the nine-pounder high explosive type equipped with the General Ordnance Company's special delayed action fuse. Shells so equipped will explode at a predetermined depth below the surface, and the drippling of submarines is thus caused, even when submerged at a depth great enough to make the complete penetration of the main hull impossible.

The Norma Co. of America

The Norma Company of America exhibits a complete line of "NORMA" High-Precision Ball Bearings as used in ignition apparatus; lighting generators, radio-electric apparatus, gyroscopic apparatus, and other high-speed equipment used in connection with the aviation industry. The company is represented by Messrs. Geo. R. Bott and E. A. Perkins, of the Engineering Department.

THE AEROMARINE PLANE AND MOTOR COMPANY

Will Specialize in Filling the Individual Requirements of

THE UNITED STATES
ARMY AND NAVY

—and—

PRIVATE INDIVIDUALS

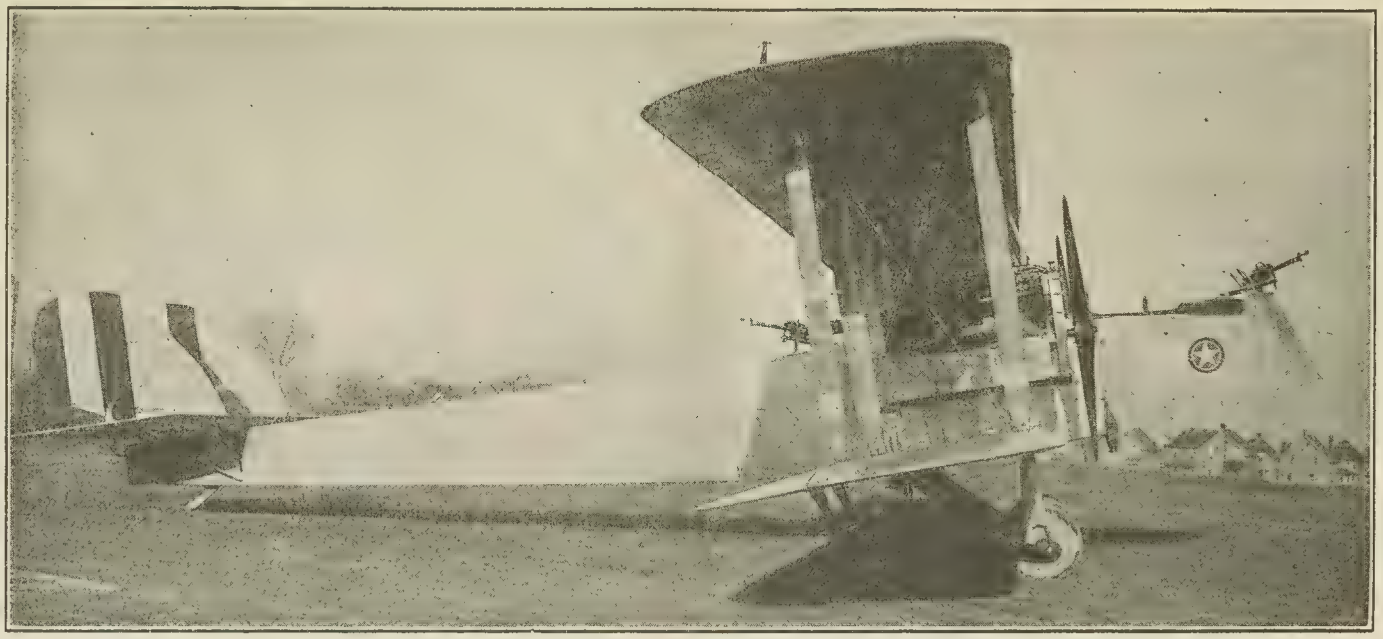
Aeromarine Plane & Motor Company
Factory—Keyport, N. J. New York Office—Times Bldg.

STANDARD'S WINGS OF WAR
1917-1918

A Record Unequaled in Our Aeronautical Annals —

All of these Planes were Developed & Produced between April 4 1917 and November 11 1918 by
STANDARD AIRCRAFT CORPORATION

A Unit of The Elizabeth, N. J. Plant



THE MARTIN NIGHT BOMBER

THE MOST IMPORTANT AERIAL DEVELOPMENT OF THE WAR

Officially, it has surpassed the performance of every competitor.

The forerunner of the wonderful

AERIAL FREIGHTER *and* TWELVE PASSENGER AIRPLANE

The skill and ability of the HOUSE OF MARTIN continue to maintain Supremacy of Performance and Dependability which they have held since 1909.

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THE GLENN L. MARTIN COMPANY
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EXPOSITION EDITION—NUMBER THREE

AIR SERVICE JOURNAL

The National Aeronautic Newspaper

VOL. IV. No. 11 NEW YORK, MARCH 15, 1919 PRICE 10 CENTS

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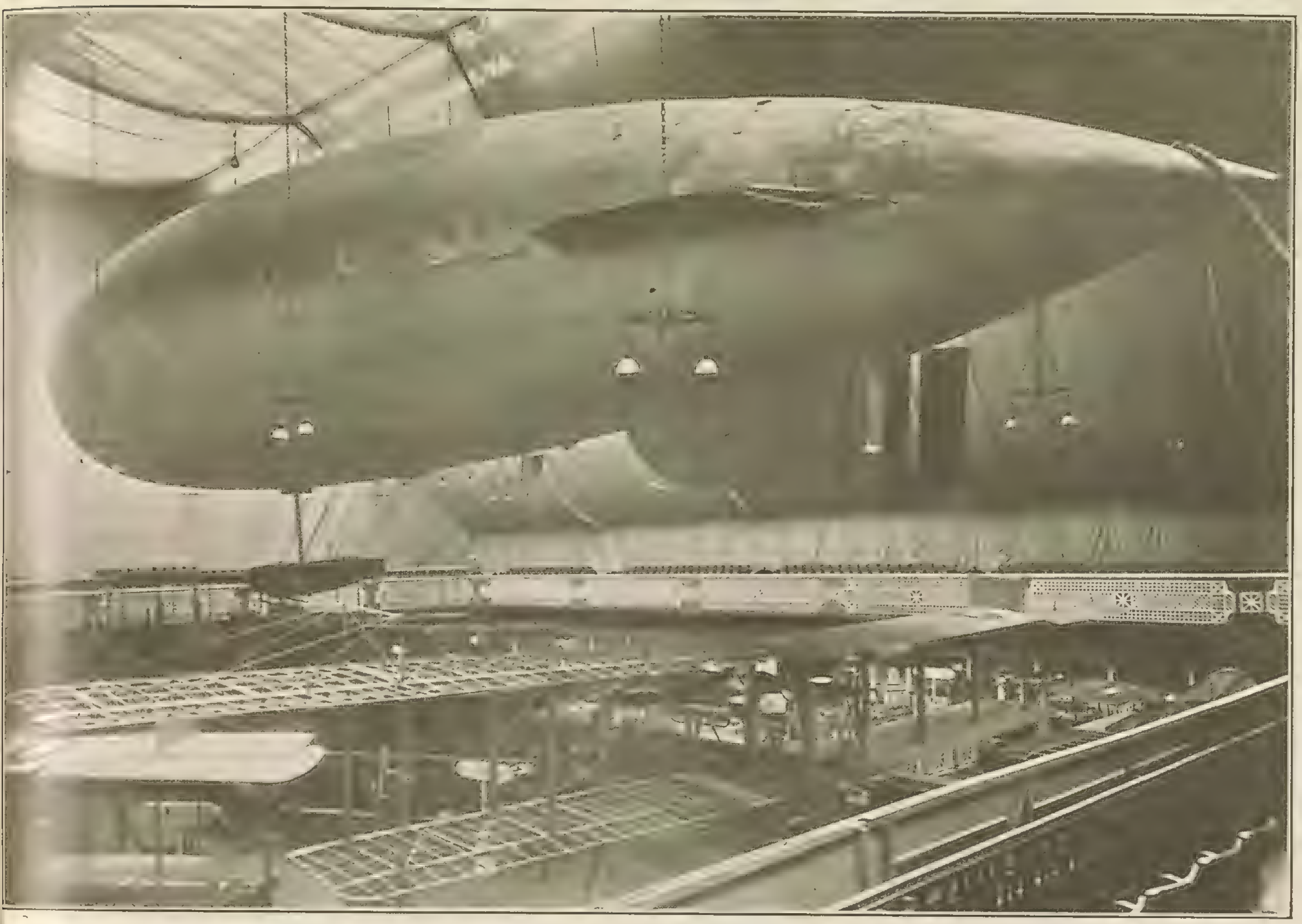
Final Days of Aeronautical Show Demonstrate Interest In Aviation



General View of the Sixty-ninth Regiment Armory, where the Aeronautical Exposition is being held. In the immediate foreground is the Navy's F-5-L flying boat, which won fame during the war in coast patrol and submarine chasing. It's upper wing stretches nearly 104 feet. Note the wing construction. It is this type of boat which the Navy is to amplify for long distance service, a flying boat of larger wing span being now actually under construction. To the left foreground is seen the L. W. F. flying boat H-S-2-L. Far to the rear is the Caproni Triplane, with a wing expanse almost equal to that of the F-5-L. To the right center is one of the airplane mail machines constructed by the Standard Aircraft Corp. A dirigible seventeen months in the service of the Navy rides among the girders.

One thing has been demonstrated beyond question at the show—the lively interest taken in aircraft by the public. From the time the doors of Madison Square Garden and the Sixty-ninth Regiment Armory were open in the morning until late every night thousands of people have viewed the exhibits. Expressions of pleasure and amazement were to be heard on all sides.

As an educational factor the Exposition fulfilled the fondest hopes of its sponsors. No longer are " aerofoils," " struts," " stream-lined " and similar technical terms words of mystery to the public; presently they will be spoken as familiarly as the nomenclature of automobile parts.

Many persons prominent in society were noted among the attendance from time to time, and probably Dame Fashion soon will set her stamp of approval on aircraft.

First Big Trade in Airplanes

W. A. Hill Buys 4 Glenn Martin Machines

COAST TO COAST TRIP

And Then a Regular Coastwise Schedule Passenger Service in California

An ocean to ocean passenger service by air is soon to become an established fact and the first flight by a fleet of passenger carrying airplanes is to be made from New York to San Francisco about August 1, according to an announcement made Thursday night at the Aeronautical Exposition in Madison Square Garden by Wesley A. Hill, of Phoenix, Arizona, recently a Lieutenant in the United States Army Tank Corps.

Mr. Hill, former Rough Rider, close friend of the late Colonel Roosevelt, and who operates thirty-five automobiles along the famous Apache Trail in Arizona and California in connection with the Southern Pacific Railroad, has organized the Apache Aerial Transportation Company, and on March 11 placed an order for four passenger carrying airplanes with the Glenn L. Martin Company, of Cleveland.

From New York to Los Angeles

Some time early in August, Mr. Hill says he will start the fleet of four planes from New York City. Each will carry twelve passengers, including the pilot and mechanician, and their destination will be Los Angeles. This will be the inauguration of the first trans-continental aerial passenger service and the trip will take about four days. Stops will be made in Cleveland, Chicago, Kansas City and other cities over the Southern route where army landing fields can be found to accommodate the planes.

On arriving on the western coast, Mr. Hill will establish a coastwise, regular schedule aerial passenger service. Just as soon as he has convinced the public of the dependability and safety of air travel, according to his statement, he will open another scheduled aerial passenger route from Los Angeles to El Paso, Texas, a distance of 1,200 miles, which will be done by air in nine hours against twenty-two hours by train.

(Continued on page 7)

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NEW YORK CITY

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New Director of Military Aeronautics

The appointment of Brigadier-General William Mitchell as Director of Military Aeronautics is in accord with the policy of the Air Service announced recently by General Menoher that "all things being equal, the flier must have preference over the non-flier; and, that again, all things being equal, the officer who has had service in France must be given preference over the one who has not had such service." General Mitchell being a flier and having had two years continuous experience at the front measures up to the qualifications mentioned.

The administration by General Kenly of the Division of Military Aeronautics has been largely the carrying out of work previously commenced and perfecting of the organizations of Supply, Training, Personnel and Operations. That the work has been creditable to the Director is well known. He has also gained the good will of the fliers by his many trips over the country by airplane.

The policy of General Kenly regarding the placing of officers with flying experience in subordinate positions and of relying on the non-flying officer for guidance has created comment that has not been favorable. His intense championship of a united air service has antagonized the General Staff and all the results that come from such disagreements naturally follow.

Whether or not the attitude of the War Department regarding the Air Service is due to shortcomings of the plans submitted by the Director remains to develop. If General Mitchell can formulate a scheme which will convince the Secretary of War that the Air Service of the future, even in peace times, should immediately lay down a large program, he will have demonstrated the fundamental soundness of General Menoher's principles.

That the Air Service needs strong champions at this time is obvious. It has been relegated to an inferior position in all plans for the future organization of the Army. With the prestige and experience of General Mitchell and the returned officers who have had actual combat experience, a new policy of the General Staff is to be expected.

A Note That Rings Clear

The most significant note of encouragement and confidence that the two weeks of the Aeronautical Exposition has sounded is the contract made by Wesley A. Hill, a business man of Phoenix, Arizona, with the Glenn L. Martin Company for the construction of four twin-engined passenger and freight carrying airplanes for regular service on the Pacific coast.

Government Regulation Needed

On the day that the armistice was signed we had factories in this country which were turning out airplanes and airplane engines and airplane paraphernalia, I am told, at a greater capacity than all the other nations put together at that time.

We find ourselves as a nation burdened with thousands of airplanes and tens of thousands of engines and paraphernalia. Thousands of planes have been offered for sale by the Government and if these planes are thrown promiscuously into the market, we will find the industry absolutely and unqualifiedly shattered for years to come. The industry cannot continue if these planes are put on the market and sold at the price which they could be sold at and the manufacturers called upon to build a plane that the public could use. There is another reason why that plane should not be thrown on the market except through the manufacturer, and that is that every one of these planes has laid in some place for a period of time. The average plane that has been built in this country is really a very strong and stable piece of mechanism But it does deteriorate. It has every angle tuned up truer than a piano, and as soon as that trueing gives way in the least, there is a change in the efficiency of that machine, and we are confronted with the dangers that a machine would have if it is sent up into the air, even with the most experienced pilots, without having the entire machine gone over and thoroughly tuned to the minute.

I have come very strongly to the belief that what we now need and what we must have is Government regulation of the air travel, Government regulation of the kind of planes that we are to build. No airplane should be allowed to go in the air unless it conforms and comes up to a certain specific standard, and it must be tried out and be found correct from an engineering standpoint.—*Harry Bowers Mingle.*

Able to Dominate the Air

Previous to the outbreak of this war, already our Navy had taken an interest in navigation and use of the air for the purpose of belligerent action aloft.

The announcement of the war found us without that preliminary preparation to enable us to at once take the supremacy, but I am pleased to say that, due to American ingenuity and the devotion of our manufacturers, at the termination of hostilities we were in a position to take complete charge aloft. Our men were able to dominate the air. At the time the armistice was signed, the American Navy had 17,000 men—fliers and non-fliers—abroad ready to take the Navy's part in the conflict. For the last eight months of the war we had been able to put abroad a sufficient number of planes to properly patrol the shores of the North Sea, the French coast and the Adriatic coast in the Mediterranean. —*Admiral N. R. Usher.*

Almost Unlimited Possibilities

The part which has been played by the aerial arm of the United States Navy justifies me in saying that the possibilities open to this new means of transportation are almost unlimited. So much has been accomplished with the military machines that as I look at these newer commercial types I cannot visualize the future. It's a wonderful prospect for aviation.—*Vice Admiral Albert Gleaves.*

NEW SCENTS A SALE AT A SACRIFICE

Indiana Senator Tells of Plans of Administration

DENIAL BY SECY. BAKER

How an Independent Department of Aeronautics Could Save Millions of Dollars for the Government

The New York *Sun* on March 10 printed a long interview with Senator Harry S. New, of Indiana, regarding the sale of government airplanes, linen and spruce at prices which would yield little or no return to the treasury. Among other things the Senator said:

"The army spent in the last two years $1,672,000,000 on aircraft, including parts, aerodromes and equipment; and the navy spent $250,000,000. At least they contracted for the expenditure of these amounts, some of which may have been saved through cancellation of orders. The Army Air Service has on hand something like 20,000 Liberty motors. It has about 30,000,000 feet of spruce which cost approximately $800,000,000. It has about 7,000,000 yards of special airplane linen.

"All of this material is for sale. If sold now it will yield but a small percentage of the original cost. The Army Air Service has 30 aerodromes and balloon depots which are to be abandoned, according to present plans, at an immense sacrifice. The same is true of the navy only in less degree. If the plan to throw all this vast store of material upon the market at sacrificial prices is carried out it will effectively kill the privately conducted establishments proposing to continue in the industry independently and force the pilots and mechanics to seek other employment. It would be a tremendous, perhaps a fatal blow to the development of aeronautics in America.

"The whole subject is so big that it would seem to be apparent that there should be a single department to consider and carry it forward, just as there is in England. It can be done under the same form of authority that was given to Mr. Hoover for the Food Administration or Mr. Garfield for the Coal Administration. Such an officer in charge of aeronautics, a division of the air, if not a department of the air, could provide for the needs of the army, navy and Marine Corps.

"He could salvage a large percentage of the hundreds of millions of dollars' worth of aeronautical material and provide for the employment of a force that otherwise would be turned aimlessly adrift. But above and beyond all he can keep this country measurably apace with foreign Governments in the conduct and development of aeronautical navigation. And he can do it with far greater intelligence, to much better purpose and at incomparably less expense than if all of these duties should be left to divided and conflicting authority."

The Senator supplied interesting statistics of the actual number of training planes now held in this country and of the number of service and training planes in France. The table follows:

Types.	At Fields.	At Repair Depots.	At Supply Depots.	Total.
JN4—A	109	20	13	142
JN4—B	22	6	..	28
JN4—C	560	49	26	463
JN4—D	2,106	128	193	2,427
JN4—H	332	11	8	351
JN4—HG	335	39	..	364
JN4—HB	86	..	..	86
JN6—HB	174	1	..	175
JN6—HO	94	..	3	97
JN6—HP	123	7	..	130
JN6—HG 1	330	..	114	444
JN6—HG 2	41	..	..	41
S4—B Gnome	64	20	..	84
S4—C Gnome	29	..	..	29
S4—C Le Rhone	427	6	..	433
E—1 Gnome	24	..	..	24
E—1 Le Rhone	85	..	..	85
DH—4	1,120	7	892	2,019
Caproni	3	..	..	3
Handley-Page	8	..	..	8
SE—5	54	..	..	54
Le Fere	6	..	..	6
R—4	44	..	..	44
Sped	41	..	..	41
Martin bomber	2	..	..	2
Total	6,037	294	1,249	7,580

In actual operation in France up to November 11, 1918:

Service planes	3,210
Training planes	3,124
Total	6,334

About 60 per cent of these were of foreign make.

He produced figures relating to planes now in process of manufacture and to planes turned over to the navy, as follows:

Planes now in process of manufacture under orders planned by the bureau of aircraft production.

Type.	Quantity Produced.	Quantity Yet to Be Produced.
JN6—HG 1	514	46
JN6—HO	100	6
DR—4	4,709	47

NOTE—Eighteen Le Pere (L. U. S. A. C. 11) planes and six Martin bomber planes are in process of production under orders transferred to the supervision of Aircraft Production Engineering Department at Dayton, Ohio.

No planes on orders placed by the Bureau of Aircraft Production are now being made for the navy, Marine Corps or for the use of the Post Office Department.

There have been turned over to the navy the following planes:

36 JN6—HG 1 planes.
10 E—1 M defense planes.
30 JN4—H planes.
56 JN4—HG planes.

Secretary of War Baker, in an interview printed March 11, said he knew nothing of any proposition to sell government aircraft material at a sacrifice. General Menoher had not communicated with him on the subject, he said.

The Statistics Branch of the General Staff, War Department, has made up the following table, which shows the number of planes and engines shipped by the Bureau of Aircraft Production to depots and storehouses from the date of the armistice to February 14:

Liberty 12 service engines	4,806
OX—5 elementary training engines	1,261
Le Rhone advanced training engines	994
De Haviland 4 observation planes	524
Hispano 180 advanced training engines	343
Hispano 150 advanced training engines	254
JN6—H advanced training planes	174
JN4—D elementary training planes	131

Flying Stops at Love Field

Flying at Love Field ceased March 9, and, with the exception of sixty-five men, the 1,000 enlisted men and cadets will leave within the next two weeks for other flying fields.

Major George R. Wadsworth

As Chief Engineer of the Naval Aircraft Factory, Major George R. Wadsworth took rank as one of the leading aeronautical engineers in the profession. He was loaned to the Navy by the Army.

Major Wadsworth graduated at the Massachusetts Institute of Technology in 1898. From 1898 to 1905, he was with the New York Central Lines Maintenance of Way Department, as designing engineer, and later was resident engineer on Grand Central Terminal improvements. From 1905 to 1907, he was with J. G. White & Co., Inc., New York City, as engineer in connection with construction work. He then went with the Metropolitan Improvements Commission, Boston, and rendered a report to the commission outlining unification of all steam railway terminal properties within Boston terminal district and laid out the plans for the development of the Boston water front.

From 1910 to 1913, he was chief engineer of the Peerless Motor Car Co., Cleveand, Ohio, after which he became Assistant to the president of Gray & Davis, Inc., Boston, Mass. He entered the service of the United States as consulting engineer in April, 1917, in the Aviation Section of the Signal Corps. Commissioned Captain June, 1917. From October, 1917, to date of armistice, chief engineer Naval Aircraft Factory, Navy Yard, Philadelphia. Major Wadsworth is a member A.S.C.E., A.S.M.E., and S.A.E. He is now connected with the United Aircraft Engineering Corporation.

AMERICA STILL HOLDS RECORD FOR ALTITUDE

Capt. Lang, R. A. F., Reached a Height of 27,000 Feet Only

SCHROEDER WENT UP 28,900

Correction Made After a Rereading of the Instruments Used in the Machine of the British Aviator

America still hols the airplane altiture record—the mark of 28,900 ft. set Sept. 18 last by Major E. W. Schoeder, A. S., at Wilbur Wright Field, Dayton, Ohio.

Since Jan. 2 it had been believed that Captain Lang of the Royal Air Force had topped this climb by 1,600 ft. in reaching a height of 30,500 ft. in England. On March 11, however, a cable message from the London *Graphic* to the authorities of the Aeronautical Exposition in Madison Square Garden said that a rereading of Captain Lang's instruments had fixed his altitude at 27,000 ft., leaving a clear margin in Major Schroeder's favor. The American made his climb in an American-built Bristol airplane equipped with a 300-hp. Hispano-Suiza motor.

More Reserve Military Aviators

The following Officers have been rated as Reserve Military Aviators from the dates set after their respective names:

Major Ora M. Baldinger, A.S.A., Jan. 30, 1919; Capt. Gordon Baker, A.S.A., Jan. 30; First Lieut. William D. Prindle, Infantry, Feb. 12; First Lieut. William M. Bailey, A.S.A., Feb. 12; First Lieut. James Wade Jenkins, A.S.A., Jan 30; First Lieut. Fielding B. Cochran, A.S.A., Jan. 30; First Lieut. Donald G. Duke, A.S.A., Jan. 30; First Lieut. Raymond C. Brown, A.S.A., Jan. 30; First Lieut. William B. Remington, A.S.A., Jan. 30; First Lieut. Charles M. Leonard, A.S.A., Feb. 11; First Lieut. Earl D. Stearns, A.S.A., Jan. 27; First Lieut. Sam George Epstein, A.S.A., Jan. 27; First Lieut. Joe Thurmond, A.S.A., Feb. 14; First Lieut. George V. Bonhag, A.S.A., Feb. 11; Second Lieut. John L. Salway, A.S.A., Jan. 30; Second Lieut. Stanley Clark, A.S.A., Feb. 10; Second Lieut. Hilton Barratt, A.S.A., Feb. 11; Second Lieut. Ralph A. Gibson, A.S.A., Feb. 11; Second Lieut. Alfred D. Karr, A.S.A., Feb. 11; Second Lieut. Granville C. Johnson, A.S.A., Jan. 27; Second Lieut. George K. Pond, A.S.A., Jan. 27; Second Lieut. Arnold M. Kent, A.S.A., Feb. 12.

How Discharged Men Can Get Their Bonus

The Director of Army Finance, Brig.-Gen. Lord, says that his division requires no formal application from discharged men to enable them to obtain their $60 bonus.

All that is necessary is a statement of the man's military service and his certificate of honorable discharge. These papers are to be mailed to the Zone Finance Officer, Lemon Building, Washington, D. C. The discharge will be returned and a check for the bonus will follow as soon as the application is reached.

A thousand additional civilians have been added to the Director's force, and it will take about three months to complete the payment of the million and a quarter men and officers entitled to receive the bonus.

Men not yet discharged will receive their bonus money in their final settlement.

GEN. MITCHELL IS GEN. KENLY'S SUCCESSOR

New Head for the Department of Military Aeronautics

PEACE TIME ARRANGEMENT

New Chief Was in Charge of Operations in the First Army Zone Until the Armistice was Signed

Major General William L. Kenly, Director of Military Aeronautics since the split from the Signal Corps, has been relieved from duty with the Air Service, discharged as a temporary Major General only, and ordered to report for duty to the Chief of Field Artillery, assuming his rank in the regular army as Colonel.

Brig. Gen. William Mitchell, who was assistant chief of the Air Service in the A. E. F. in charge of operations in the army zone until the armistice, and who then became chief of the Air Service in the Third Army of Occupation, will succeed General Kenly as Director of Military Aeronautics.

On a Peace Time Basis

This change in Directors is officially described as part of the reduction of the Air Service to a peace time basis. After March 15 there are to be only two training fields and the personnel is to be cut down to the number needed for these two fields. So far as possible this personnel will be drawn from those officers and men who want to remain permanently in the service.

These orders represent a new effort to keep demobilization up to a schedule and get the total of discharges to the 2,000,000 mark by the end of the present month. The cancelling of General Kenly's war-time rank and his assignment to his own branch of the service, the field artillery, in his permanent rank of Colonel, was said to be in line with the policy of reduction all along the line.

The orders also were interpreted as signalizing the new status of the Air Service which is developing and the fact that General Menoher has actually taken hold of the entire service, both production and operation, after devoting nearly two months to studying the situation, during which time he did not interfere with the methods he found on his return from France, where he commanded the 42d (Rainbow) Division.

The appointment of General Menoher, after the resignation of John D. Ryan, as Civilian Director and Assistant Secretary in charge of aviation matters, meant that the Air Service was to be combined for peace purposes under a single head, since the bulk of production problems ceased with the termination of hostilities.

Only Two Fields

General Menoher has not yet designated the fields at which training for the Air Service is to continue. Including numerous special fields, about thirty aviation fields and centers were in operation during the war. In selecting two of these it was said that General Menoher undoubtedly would be influenced by year-round weather conditions. This would imply the selection of some of the Southern fields.

Colonel Kenly's Record

Col. William L. Kenly is one of the most distinguished soldiers of the old military establishment of the United States. As an artillery officer, a branch of the service to which he now returns, he earned lasting honors both for personal courage in action and for progressiveness in bringing the American field artillery up to the high point of efficiency which it enjoyed when the United States entered the war.

From the day that he was transferred from the artillery to command of aviation in France, Colonel Kenly has been flying almost constantly. No other man of his age in the American Air Service flies at all. He is fifty-one years old, yet he has established numerous speed records in flying, one of his latest achievements being a flight from Anacosta Field, Washington, to Mineola in one hour and thirty-nine minutes, time being taken from the moment of leaving the ground in Washington to actually landing on the ground on Long Island.

Won Fame in the Philippines

Prior to the entrance of the United States into the war in Europe Colonel Kenly was best known for his work as an artillery officer in the Philippines. His most notable achievement was on June 13, 1899, when at the battle of Zapote Ridge he and his men pushed four mountain guns by hand to the river's edge less than forty yards from where the enemy was strongly intrenched. In this action Kenly's company lost half of its men in killed and wounded. In both the Santiago and Philippine campaigns Kenly served with Capron's famous battery, light battery E, First Artillery, and it was during these strenuous days of guerilla fighting that he won the name of "Fighting Bill Kenly."

Colonel Kenly was one of the first American officers to land in France. As commanding officer he took the Seventh Field Artillery from San Antonio, Texas, to France, arriving at St. Nazaire Aug. 11, 1917. Ten days later he was made a brigadier general and took command of the Second Field Artillery Brigade. He then was appointed Chief of the Air Service of the American Expeditionary Force, in which position he saw much fighting. During January, 1918, he was under fire several times in French airplanes on the western front.

Took Part in Famous Raid

In the following month he took part in the now famous bombing raid made by British and American officers over Bruges. The airplane, a British Handley Page, was under heavy fire for more than four hours and the wings were shot full of holes, but the entire party returned in safety to the British lines. Later Colonel Kenly studied in both British and French aviation schools, although before going to Europe he had taken a course in the Signal Corps Aviation School at San Diego, Cal.

Colonel Kenly entered West Point from Maryland in September, 1885, was graduated four years later, joining the Fourth Artillery as a second lieutenant. He became a first lieutenant in June, 1896; a captain in February, 1901; a major in April, 1907; a lieutenant colonel in August, 1912; a colonel in July, 1916; a brigadier general in August, 1917, and a major general in April, 1918.

During his career as an officer he has been graduated from the Artillery School at Fortress Monroe and the Field Artillery School of Fire at Fort Sill, Oklahoma. He also served two years on the Mexican border with the Sixth Field Artillery, a mounted regiment.

Brigadier General William Mitchell, New Director of Military Aeronautics

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PARIS AIR CONFERENCE IS ENDED

Delegates Found Consideration of Air Navigation Inexpedient Now

INDEFINITELY POSTPONED

Peace Convention Delegates Feared That the Control of Air Routes Might Become Involved

Like the International Wireless Conference, which assembled in Paris several weeks, ago, a similar gathering which was intended to deal with problems relating to aerial navigation has been compelled to postpone its work indefinitely after having merely perfected its organization.

Mere suggestions of the extensive plans which were to be brought forward for consideration developed the fact that most nations might be obliged to make wholly unexpected changes in their fundamental laws if they participated in decisions. This made necessary the reference of many problems to home Governments, and it is understood that it will require consideration of many months before the delegates will be able to proceed with the conference.

The air conference was to be merely a French, or possibly Franco-British, affair, but the appearance in Paris of accredited delegates of many other nations made it necessary to hold matters in abeyance for the time being. The delegates to the Peace Conference were quick to see that what amounted to a control of aerial navigation might be involved in the decisions of the conference and lost no time in demanding that their nations be represented.

The first Inter-Allied Medical Aeronautical Congress opened in Paris March 11, its object being to promote the study of medical problems arising from aviation. Resolutions dealing with physical and psychological tests applicable to candidates for pilots' licenses, the control of flights to high altitudes and the use of oxygen by aviators were presented, and the hope was expressed that these resolutions would be taken into account when an international aerial code is drafted.

The United States is represented at the congress by Dr. L. G. Rowntree of Minneapolis, Minn.

Talked to Seaplane 150 Miles Away

Secretary Daniels talked on March 11 by radio telephone with Ensign Harry Fagenwater in a navy flying boat en route from Washington to Hampton Roads. Communication was established at a distance of more than 150 miles,

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General Mitchell Speaks Before the S. A. E.

Brig.-Gen. William Mitchell, Director of Military Aeronautics, told the meeting of the Society of Automotive Engineers held in the Engineering Societies Building, 29 West Thirty-ninth street, March 7, in connection with the aeronautic exposition, that in the last two months of the war the American aviators were so successful that the Germans seldom dared attack them.

If the war had lasted until spring, he said, the aviation service had planned to cooperate with the infantry very extensively by dropping men with machine guns in parachutes behind the German lines, thus providing a way to attack the Germans from the rear, simultaneously with a frontal onset.

Speaking of the aerial combats at St. Mihiel and illustrating his talk with stereopticon views, General Mitchell instanced the work of the first pursuit group under Colonel Hartney. These enterprising young men, he said, shot down 110 German planes and lost only ten machines. General Mitchell, who had charge of the zone of advance on the French front, described the numerous difficulties encountered in that offensive.

"There were 4,000 cannon firing at once at St. Mihiel," he said. "The reverberations of the big guns was so great that the gas tanks of our machines were loosened and began to leak. I had 1,600 planes in charge, and they were kept only six kilometers back of the front line."

He paid a tribute to the personnel of the American air force, declaring that it was the finest in the world. What it lacked was sufficient officers with substantial military experience in aviation, he said.

Other speakers were Lieut.-Col. V. E. Clark, who described the development of military airplanes during the war, and Commander J. C. Hunsaker, who told of the work of the naval airships.

Buys an Airplane for Business Travel

One of the first practical demonstrations of the utility of the airplane in every day business pursuits is to be made by Charles B. Howard of Sherbrooks, Provice of Quebec, Canada, when he begins to cover the 180 miles between his residence and business by airplane, this spring.

Mr. Howard and his father operate the large lumber business of B. C. Howard & Co., at English Lake, Quebec, and just across the border in Maine. During the war they supplied considerable spruce for airplane lumber. The Howards make two round trips a week from their home in Sherbrooke to the company's lumber operations at English Lake. The air line distance is 180 miles, but the round about railway journey on the Quebec Central consumes approximately thirteen hours each way.

"This means," said Mr. Howard to an Air Service Journal representative at the Biltmore, "that we are forced to waste in railroad travel some fifty-two business hours a week, as the only available trains are on a day schedule.

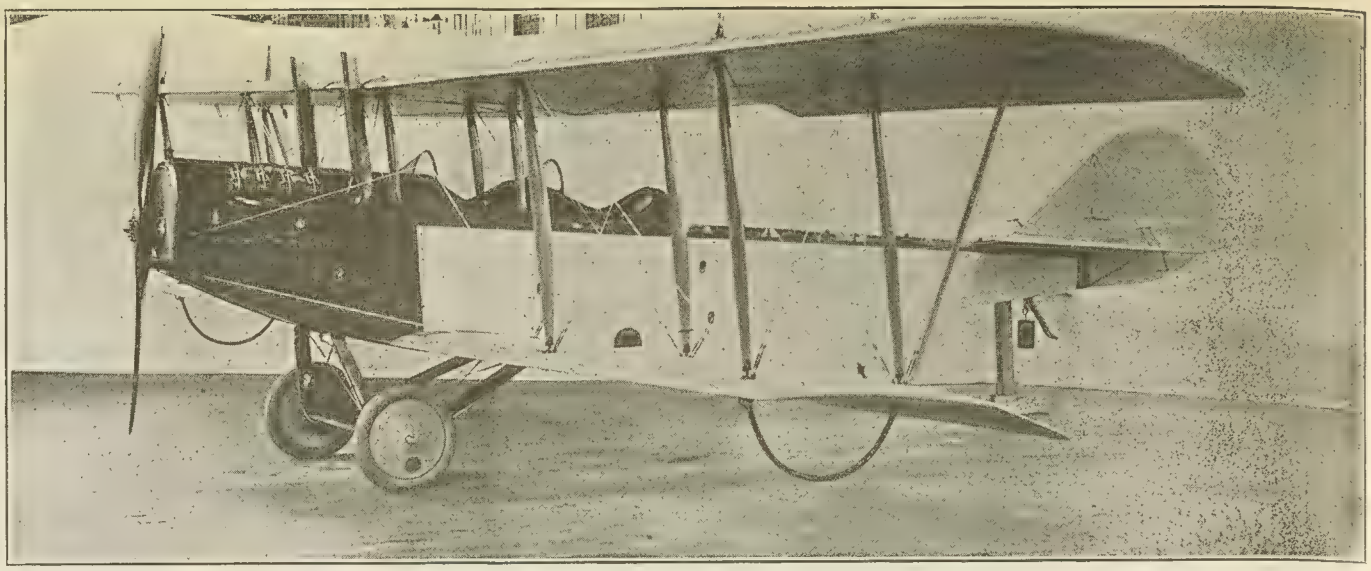
"From time to time during the past two years," he continued, "we have considered purchasing an airplane, but during the war civilian flying was prohibited in Canada the same as in this country. However, we decided to purchase at the first opportunity a plane capable of carrying three persons—my father, the pilot and myself.

"Business brought me to New York during the first week of the Aeronautical Exposition and I put in a very interesting day there getting the dope on the machines that might be suitable for my modest venture in aeronautics. As a result I decided to buy one of the Canadian JN-4's which are being disposed of by the United Aircraft Engineering Corporation for the American Syndicate which recently made the large purchase of Canadian air equipment."

This machine will be used on the first Canadian private business air line. Mr. Howard said his decision was influenced not only by the reasonable price, but the reputation for reliability which the JN training plane bears, as well as the fact that spare parts may be obtained for these machines at any time.

Mr. Howard has engaged Lieut. G. McKay, a Canadian member of the Royal Air Force, as pilot. He wired McKay to proceed to Borden Field, Canada, and select a machine, upon the assurance that complete official data on performance, hours of flight and other details would be furnished before a final selection was made. Upon completion of alterations in the rear cockpit to accommodate two people the machine will be shipped direct to Sherbrooke for its initial commercial flight.

Mr. Howard stated that his venture in flying was prompted entirely by practical business considerations—the saving of time, 13 hours by train between Sherbrook and English Lake, against the air line distance of 180 miles, which he expects to make in from two and a half to three hours. Mr. Howard is married, has two small sons and is 33. He looks upon the airplane as a safe, practical and economical means of transportation when time is the main consideration. His elderly father is of the same mind and will share the rear cockpit on practically every trip, Mr. Howard says.


Royal Air Force Canadian Training Plane Exhibited by the United Aircraft Engineering Corp.

Boeing Seaplane—Type C-1-F

The model C-1-F is an advanced modification of the Boeing type "C" seaplane used by the Navy Department for training purposes during the recent European War. This machine embodies the use of the single float and the Curtiss OXX-2 8-cylinder motor. A further modification from the "C" type lies in the use of one degree of dihedral rather than 2¾ degrees as used on the older machine.

Wing Structure

The wing structure follows the model "C" in that a 50 per cent stagger and 2½ degree declage is used. This combination assures the inherent longitudinal stability which has been characteristic of previous Boeing designs. The center cabane struts are made of seamless steel tubing with special steel terminals, giving a simple, efficient and sturdy center section construction. The forward construction of the cabane eliminates fore and aft stays and furnishes substantial means of bracing the side radiators. The interplane spruce struts are of straight streamline form tapered at the ends to accommodate strut sockets, while the internal drift struts are made from web sections, of box form. The wing fittings are of special design, giving a minimum of head resistance, while providing for maximum strength necessary. The wing tip floats are provided, these being of conventional form and securely braced to the lower wings.

Tail Unit

The design of this unit is characterized by extreme simplicity as well as maximum strength. Balanced elevators are used, giving automatic adjustment for differences in loading. This feature is particularly notable to pilots in that maximum and minimum conditions in the distribution of the useful load are unnoticed in flight. The elevators are fixed to steel shaft, having center and two end bearings for supports. Fin and tail posts are of steel, making a thoroughly satisfactory mounting for bracing and tubes.

Landing Gear

The landing gear is of conventional single float type. The underwater lines of this float are such as to assure quick get away and easy landing without undesirable spray and water disturbances. The stability of this machine has frequently been demonstrated while taking off, landing, and taxying in rough seas and while drifting in as high as 30-mile winds. The float is of two-ply laminated construction and with cotton and marine glue between the laminations. The external float fittings are such as to facilitate rapid assembly as well as to transmit all stresses to the center longitudinal bulkhead, which is the main strength member of the float. The landing struts are of streamline steel tubing, making a very light and strong structure.

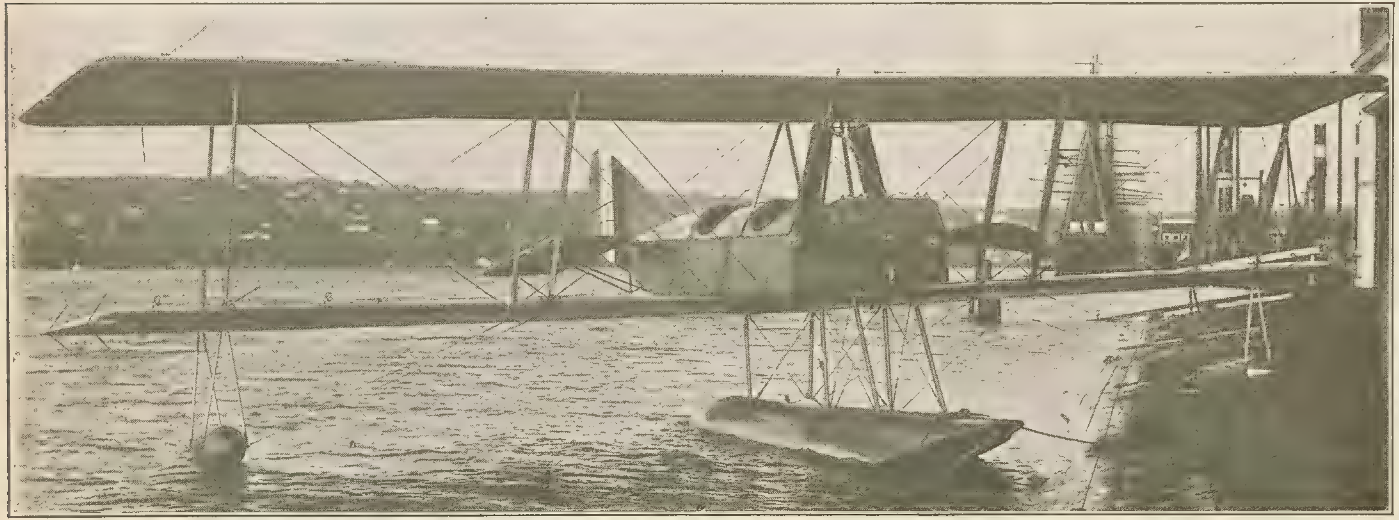
Body

The body is of the conventional longeron truss type with metal frames for engine bearers and metal carry through struts for lower wings. The seats are made from a series of ash slats conforming to the attitude of the occupant and covered with detachable upholstery. The cushions are stuffed with Kapoc and are readily detachable for use as life preservers in emergency. The instrument board is equipped with all instruments necessary to indicate the operation of the machine. The surface control is Dual Deperdussen, featuring an adjustable rudder and adjustable rudder compensator for distance service. The engine throttle is mounted at the right of both cockpits, and the ignition retard is at the left of the pilot's cockpit. The Curtiss OXX-2 100-hp. motor has proven extremely satisfactory. It is light, powerful, economical and free from undesirable vibration in the range of flying operation. A hand starting lever is provided immediately behind the motor and has given satisfactory service. As mentioned before, the cooling system is mounted to the rear and above the motor. This mounting is exceptionally effective and has performed satisfactorily in service. The gasoline tank is immediately behind the motor and supplies gasoline under atmospheric pressure to the carburetor. The carburetor lead is supplied with a shut-off valve operated from either cockpit as well as a convenient drain beneath the body.

Performance.

1—*Power Plane.*	
Curtiss OXX-2	100 hp.
2—*Wing and Control Surface Areas.*	
Main Planes (including Ailerons)	493 sq. ft.
Upper Planes (including Ailerons)	264 " "
Lower Planes	229 " "
Ailerons	36 " "
Number of Ailerons	2
Elevators	30 sq. ft.
Rudder	12 " "
Vertical Fin	6 " "
3—*Over All Dimensions.*	
Span Upper Wing	42 ft. 11½ in.
Span Lower Wing	42 ft. 11½ in.
Chord Upper and Lower Wing	69 in.
Gap	72 in.
Length over all	27 ft.
Height over all	12 ft. 11½ in.
Dihedral	1 degree
Stagger	29½ "
Incidence of upper wings	6½ "
Incidence of lower wings	4 "
4—*Performance.*	
Climb in 10 minutes (full load)	1800 ft.
High Speed	70 miles per hr.
Landing Speed	38 miles per hr.
Endurance at full speed.	2½ hrs.
5—*Weight.*	
Loaded	2,445 lbs.

The company is represented by C. L. Egtvett, experimental engineer, and E. N. Gott, vice-president and general manager.


The Boeing Seaplane—Type C-1-5

Triplex Safety Glass Corp.

Samples of the non-shatterable glass manufactured by the Triplex Safety Glass Corp. forms the exhibit of that company in the Sixty-ninth Regiment Armory. Several aviators' goggles that had been in serious smash-ups and served to save the eyes of the pilots are shown in addition to plates for automobile windshields.

FIRST BIG TRADE IN AIRPLANES

(Continued from page 1)

This will be the first leg of the proposed transcontinental air passenger route. Another company will be organized to transfer the passengers to the middle west and still another to bring them on to New York City, but a through ticket will be sold for the entire trip, the same as travel by railroad.

Like the Martin Bombers

The planes to be used in the cross country service are duplicates of the twin-motored bomber developed by the Glenn L. Martin Co. for the United States Government, which holds several world's records, according to Mr. Martin, except that it will contain passenger equipment instead of military. The planes have a wing span of 72 feet and a length of 45 feet. They will be equipped with two 400 h.p. Liberty motors. Two passengers will sit in front of the nose of the plane directly in front of the pilot and mechanician. Behind the pilot eight passengers will sit in couples. Between the pilot and passengers is a storage capacity for 500 pounds of mail and express matter. The passengers will be enclosed in a limousine body, enabling them to view the country while being protected from the weather. Flights will be from sunrise to sunset.

Mr. Hill stated that a New York City hotel man had offered him $5,000 for a seat on the first flight and offered to produce two more who would pay the same price.

All of the plans for the flight and establishment of the first aerial service have been thoroughly worked out by the organizer and Glenn L. Martin and the trip may be made earlier if the planes can be delivered.

Mr. Hill is a striking figure of the west, but a conservative business man, who went to Arizona when a mere boy and rode the first pony express over the old Apache trail. When that great reclamation project, known as the Roosevelt Dam was started, Hill put on his horse-drawn stage coaches, hauling hundreds of workmen over the Apache trail, then a wonderful completed road. Upon the advent of the automobile he took off the old stage coaches and put in their place modern motor cars, but all the time he was thinking of aerial transportation,

Colonel Roosevelt's Prophecy

In 1912 Mr. Hill took Colonel Roosevelt over the trail in one of his large auto stages, and talked to him of a plan to transport passengers by air. This was the year Colonel Roosevelt dedicated the dam and after listening to Hill the Colonel said:

"Well, by Jove, that's a great idea. I really believe that some day you will be carrying people over these wonderful mountains through the air."

In June, 1917, Mr. Hill organized the Apache Aerial Transportation Co., and took the matter up with Glenn L. Martin, looking to the building of large passenger carrying planes.

Fortunately in many ways for Mr. Hill, the great world war called a halt to further consideration of his dreams at that time. He tried to enlist in the air forces of his country, but was rejected on account of his age. He then took a chance in the tanks corps, was accepted and received a commission. The date of the signing of the armistice found him still in this country as a tank driver instructor. During his nine months' service in the Tank Corps, he was constantly watching the development of the airplane, so when his country told him it needed his services no longer, he immediately took up his plans where the war broke them off.

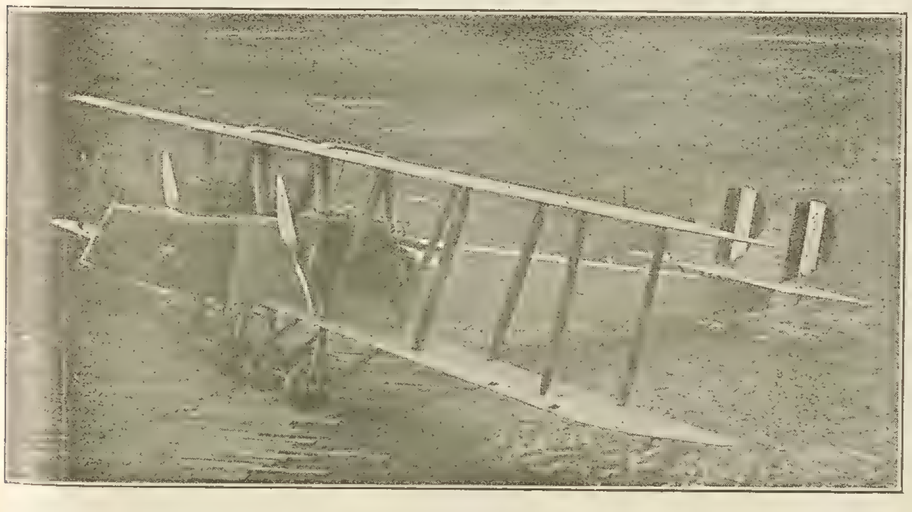
On last Tuesday Mr. Hill placed his order with the Glenn L. Martin Co. for four large twelve passenger planes and this summer the first flight will be made without any doubt, Mr. Hill enthusiastically stated last night.

A World Famous Trail

During the last five years Mr. Hill has handled more than 37,000 tourists over the Apache Trail, being connected with Southern Pacific Railroad as a common carrier, handling tourists on coupons issued by that company on contract. The Apache Trail is one of the world's famous scenic routes.

The company will establish the Pacific Coast leg of the first transcontinental Air Route, operating from El Paso to Los Angeles to San Diego and San Francisco. As a preliminary operation to prove the success of the undertaking and organization, a regular service will be established between Globe and Phoenix, Arizona, and San Diego, Cal.; also a kite shaped trip taking in Los Angeles, Passadena, Pamona, Riverside and other inland coast towns. By the summer of 1920 and probably before, a regular schedule will be established between Port Los Angeles and Catalina Island. This, of course, will be by hydroairplane. It will be only a 20 to 30 minutes flight against four hours by boat. The travel is heavy and quite a number of boat planes will be operated.

Mr. Hill stated last night that he expected so many applications for seats in the first flight from New York in August that he intended to make it a sporting proposition and would offer all seats at auction.



This is the Martin Bomber. It is the same plane, with the exception of minor changes in the interior construction of the body, as the twelve passenger commercial machine for freight, mail, express and passenger carrying. It carries a useful load of 4,000 pounds and is the machine four of which have been bought by W. A. Hill

Photo Press Ill. Service

Glenn L. Martin, President of the Glenn L. Martin Co.

Will Stay in the Aircraft Field

Many of the airplane accessory and parts manufacturers are in a receptive mood in regard to their business for the future. They are convinced that there will be a substantial development within a period of from one to three years, but in the meantime are planning to go into other lines of production.

An encouraging sign of the absolute conviction of other manufacturers that there is to be an immediate and substantial commercial development is the fact that the Standard Turnbuckle Co. of Corry, Pa., said to be the largest turnbuckle manufacturer in the world, is going right ahead with its production and selling plans. It expects to continue to do business with the older companies and to interest new companies coming into the field.

The Standard Turnbuckle Company produced in large quantities during the war turnbuckles for practically every type of army and navy planes. They started in the summer of 1915 with a production of 500 turnbuckles a week for the Curtiss Company at the time the latter secured its first British contracts. From that beginning the company has grown to an organization of 800 people and a production of over 100,000 turnbuckles per week. They have exported their product throughout the allied world. Last year they produced over 4,000,000 turnbuckles.

The range of their product runs from turnbuckles for the Loening seaplane, the smallest in the world, to the Navy's NC-1 with its 127 feet wing spread. With the increasing development of streamline wire, part of the Standard Company's facilities are being devoted to producing forked ends.

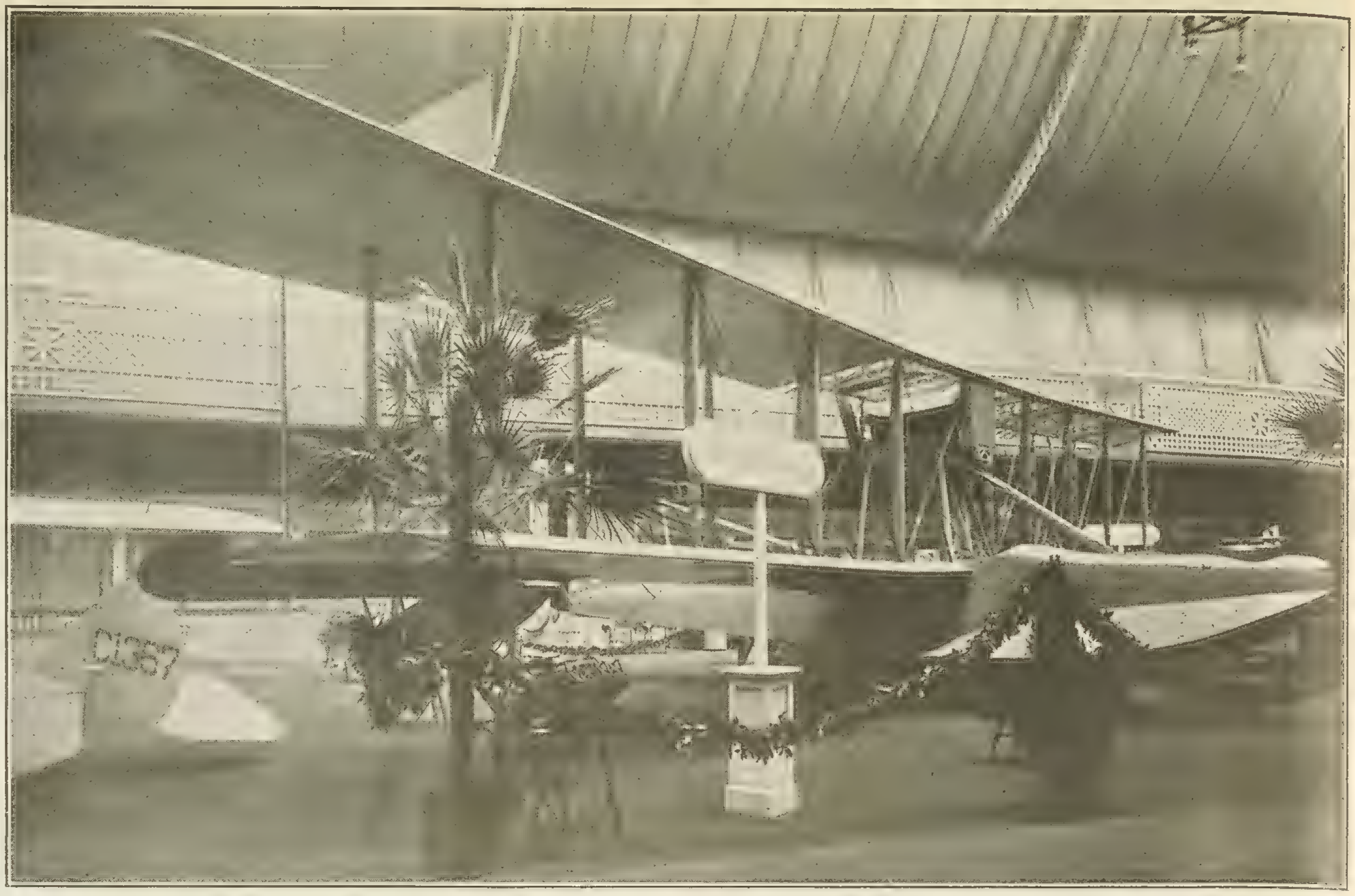
The decision of the Standard Turnbuckle Company to remain actively in the airplane business in view of its great production resources is of more than ordinary interest at this time.

Closing Days of the Show

The closing days of the Aeronautical Exposition in Madison Square Garden and the Sixty-ninth Regiment Armory demonstrated thoroughly the keen public interest in aviation. Favored almost daily during the period of the show—March 1 to 15—by weather spring-like in its sunshine and balminess and aided by numerous publicity "stunts" of a spectacular character, the show attracted thousands of spectators who displayed eager interest not only in the exhibits of airplanes, seaplanes and airships, but of the multifarious accessories as well.

Among the prominent visitors to the show have been Assistant Secretary of the Navy Franklin D. Roosevelt, Major Gen. Wm. L. Kenly, Admiral N. R. Usher, U. S. N., Benedict Crowell, Assistant Secretary of War, Senator Kay Pittman of Nevada, and Major Maurice Connolly, former Congressman from Iowa. General Kenly, Senator Pittman. Mr. Crowell and Major Connolly flew to the show from Washington. General Kenly came with Major Wm. C. Ocker in a DH-4 in 1 h. 41 m. The others were piloted by Capt. Roy C. Francis in a Glenn L. Martin bomber.

A new record for long distance flight in the United States was established on March 7 when Major Reuben F. Fleet and Capt. Earl F. White, ordered to report at the show, flew to Hazelhurst Field, Mineola, L. I., from Dayton, Ohio, a distance of 664 miles, in 4 h. 33 m. The air line between the two cities is only 540 miles, but the fliers were driven 100 miles off their course by storm.



H 5 2 L Submarine Chaser or Three Passenger Commercial Plane, Built by L. W. F. Engineering Co., College Point, L. I.

Lawrance Three Cylinder Engine

The Lawrance 3-cylinder airplane engine is intended for use on sport type machines to carry either one or two people, and has been designed especially to fill this need. It has been worked out with the idea that a man who wished to take care of his airplane must have the minimum work to do in order to keep it in good condition. Therefore, it has been found advisable to design an engine with only three cylinders and arrange it in such a way that all the parts which need attention are readily accessible.

The crankcase and air-cooled cylinders are of aluminum, this metal being used on account of its high conductivity which is very desirable for air-cooled engines. The crankcase contains a single throw crankshaft of chrome nickel steel on which the three connecting rods work, and the reciprocating and rotary forces are counter-balanced by a pair of balance weights. This gives a very good balance far superior to the four cylinder automobile type of engine.

Cylinders are of cast aluminum with air-cooling fins machined on them, and with the head integral with the cylinder. In the head is cast a bronze seat for the valves. This bronze seat has been found very satisfactory requiring grinding very seldom, and on account of the coefficient of expansion of the two metals being very nearly alike, there is very little danger of its breaking loose with the expansion and contraction of the cylinder at different temperatures.

The valves, one inlet and one exhaust, are mounted in the head at a slight angle with the bore. They are both hollow, and the exhaust valves are treated with mercury in order to assist in cooling the heads of the valves. They work in bronze guides in the head of the cylinder. Here again bronze is used instead of iron because its conductivity is greater. The valve springs are of a new type. They are made of a flat ribbon of steel which is tapered so that its width is considerably less at one end than at the other. It is then rolled into a spiral, the wide part of the ribbon forming the outer coils. This gives a spring which has a very short overall length, and in which all the coils are stressed equally.

The steel liners are pressed into the cylinder by a hydraulic press. They are 1-16 in. thick, and case hardened and ground in place, making a very fine wearing surface for the pistons, which are of the ordinary round type with flat heads, and they have four ⅛ in, rings at top and one wiper ring at the bottom of the skirt.

The wrist pins are of the full floating type, and are kept from coming in contact with the walls of the cylinder by two bronze buttons which are pressed into their ends. The connecting small end is bushed with Non-Gran bronze, and the rod itself is a hollow round rod drilled from the top end. The big end of the rod is in the form of a segment of a circle, and fits in two grooves in the bronze bearing on the crankpin in a somewhat similar way to the method used on the Le Rhone rotary engine, except in this case the crankshaft is made all in one piece, and the bronze bushing is split and bolted together with four bolts.

The propeller hub is mounted on the crankshaft on a taper of very ample proportions, and is pulled very tightly into place by means of a differential thread. On account of the generous proportions of these parts chafing of the propeller shaft and hub is never experienced.

The valves are operated by means of three individual camshafts, one for each cylinder, which are also used to drive various auxiliaries such as oil pump, distributor, tachometer. These camshafts operate the cam followers with rollers and a push rod having a ball at each end. One of these balls is adjustable for valve clearance. On the end of the rocker arm which operates the valve is a small roller, which obviates any side thrust against the valve guide. On account of the expansion of the cylinder, the valve clearance varies very considerably, and the camshafts are so designed that the rollers attack the cams for the proper timing with .060 in. clearance. In order to obtain this clearance when hot, it is necessary to adjust for .015 in. when cold.

The oiling system is interesting in that the manufacturer employs a system whereby the crankpin is oil cooled. Oil under pressure is forced through the shaft and a certain amount escapes at the various bearings for lubrication purposes. The remainder flows through a hole at the front end of the shaft, and passing through a ball check which maintains it at the desired oil pressure returns to the cylinder. The sump or oil tank is integral with the motor, being fastened to the pump by the crankcase. The oil runs by gravity into this sump which on account of its exposed position is well cooled by the air stream. The oil is pumped through an ample strainer which can be removed very easily for cleaning purposes, and returns to the pump.

Two forms of ignition are used on these engines, namely, a special magneto, which was designed for this job by Mr. Kliesrath, the engineer of the Simms Magneto Co., or the Philbrin battery ignition. Both of these systems are of interest as in both cases two plugs are fired absolutely simultaneously, only one breaker being used at a time. In case of the magneto the armature has one primary wiring but two high tension wirings and a separate distributor, the magneto running at 1½ times engine speed, and the distributor at ½ engine speed. This high speed of the magneto makes starting easy, and the magneto can be reduced to the smallest possible proportions, weighing in this case 7½ lb.

The Philbrin ignition runs at one-half the engine speed and consists of two separate primary breakers, two high tension distributors, and two coils. By means of a switch either breaker can be put in use, operating both coils and both high tension distributors. Equipped with this system with a 20 ampere hour storage battery, the engine weighs two pounds more than equipped with a magneto. The weight of the motor is 130 pounds with magneto and 132 pounds with the Philbrin system. This weight includes everything ready to run including the propeller hub. It does not, however, include the oil tank which weighs five pounds additional.

The question of mounting an engine of this sort is very important and considerable experiment was carried on. It is a great advantage to distribute the stresses over various parts of the crankcase.

The carburetor used is a Miller 1¾-in. type with barrel throttle having an altitude adjustment by which the level in the float chamber can be varied to suit the conditions.

Splitdorf Electrical Co.

The Splitdorf Electrical Co. of Newark, N. J., exhibits comprise show stands with various magnetos mounted thereon in an attractive manner; also spark plugs and measuring instruments which have been used by the Army and Navy during the war in wireless work. The following engines are users of Dixie aero type magnetos: Aero Marine Plane & Motor Co., Curtis OXX, Wright-Martin Aircraft Corpn., B. F. Sturdevant, Thomas Morse Aircraft Corpn., Orlo Motor, Union Switch & Signal Co., Hall Scott, Union Gas Engine and Deusenberg Motors Corpn.

Also shown is the Standardized Dixie Airplane Ignition, which, with only sixteen extra parts, permits of the magneto being used for any of the following engines: 4-cylinder, 6-cylinder, 12-cylinder, 16-cylinder, Dixie 845, and Dixie 1245.

Another exhibit is a magneto application suitable for a Liberty 12-cylinder 45-75.

Champion Ignition Co.

The Champion Ignition Co. of Flint, Mich., is exhibiting a number of AC spark plugs at Booth 514, Madison Square Garden balcony. Among the AC plugs shown are those which were standard equipment for Liberty and Hispano-Suiza aircraft motors, of which 40,000 were being made a day at the time the armistice was signed. The AC plug was developed by Albert Champion, a pioneer in spark plug manufacturing, and president of the company.

Joseph H. Ascheim, A. J. Schwarz and B. Taliaferro, salesmen, are representing the firm at the Exposition.

U. S. Ball Bearing Mfg. Co.

The U. S. Ball Bearing Mfg. Co., Chicago, Ill., manufacturers of Strom bearings, are represented at the Show with an exhibit of various aircraft and standard ball bearings.

The number of aircraft bearings produced by this company in the last year and a half in addition to their vast output for other purposes, nearly touched the million mark.

These bearings were furnished for various types of aircraft motors among which were: Liberty Rolls-Royce, Le Rhone, Clerget, Hispano-Suiza, Beardmore, Gnome, Hall-Scott, and Renault, B. H. P.

The company is represented by Howard L. Spohn, Commercial Manager; H. Wickland, Eastern Representative, and Harold E. Johnson of the Sales & Engineering Department.

The Wyman-Gordon Co.

The Wyman-Gordon Company, of Worcester, Mass., is presenting an exhibit of airplane crankshafts forged by them for Allied nations. The shafts exhibited are for the Liberty, the British Royal Aircraft motor, the Diamler Company's Hispano-Suiza, the Rolls-Royce, Curtiss, Fiat, French Government Hispano-Suiza and Wright-Martin Hispano-Suiza. Included in the exhibit are the Liberty camshaft and the Liberty connecting rod.

The Wyman-Gordon Company is represented at the Exposition by H. G. Stoddard, vice-president; F. E. Wellington, assistant; and John H. Toomey and Donald Frost of the Experimental Laboratory.

Stromberg Motor Devices Co.

The Stromberg Motor Devices Co. of Chicago is showing at its booth on the gallery floor of Madison Square Garden a number of carburetors, including the new Stromberg for automobiles.

Lt.-Col. Henry W. Harms
Copyright Harris and Ewing

The work of collecting technical information in England has been in charge of Lt.-Col. Harms, who has handled a large volume of such matter with great skill.

He was graduated from West Point in 1912 and commissioned 2d Lieut., U. S. Cavalry. He served on the Mexican border from September, 1912, to January, 1915. He was then assigned to aviation duty at San Diego and received the rating of J. M. A. in July, 1915. Served with the 1st Aero Squadron during the summer of 1915.

For exceptional work he was sent to the Massachusetts Institute of Technology to take a course in aeronautical engineering, on the completion of which he was placed on duty in the Aviation Section of the Signal Corps, where he remained from June, 1916, to October, 1917.

Lt.-Col. Harms was ordered overseas in October, 1917, and spent seven months in France and seven months in England.

On his return to the United States he was assigned to the Technical Section for duty at McCook Field.

Fine Exhibits of Aircraft Accessories

American Propeller & Mfg. Co.

The American Propeller & Manufacturing Co. of Baltimore, Md., exhibits the representative types of Paragon Propellers listed below:

Pattern 130: Paragon Tortional Propeller with variable pitch, designed primarily for training machine using the Curtiss OX Series and similar engines. This propeller has on different occasions shown 33 1-3 per cent faster climb than the nearest competing design with an additional increase of speed in straightaway flight. These figures are substantiated by authentic reports.

Pattern 160: Paragon "Toothpick" Propeller, designed for training machines; a lower-priced propeller, slightly less efficient than pattern 130, but very serviceable. It is a desirable and economical type of propeller for training purposes.

Pattern 178: Another Paragon Torsional Propeller, variable pitch design, which by every report is the most satisfactory propeller made for the 150-hp. Hispano-Suiza motor. It is used extensively by the U. S. Government and is preferred by every pilot who has flown it.

Pattern 176: Paragon Torsional Propeller, with variable pitch, designed for Liberty-motored DeHaviland machines; also used with excellent results on the Curtiss R. It combines the advantages of giving rapid performance in climbing and high flying speed in the same propeller.

Pattern 189: A representative specimen of the famous Paragon Three-bladed Design, embodying the patented three-bladed hub construction which is exclusively the product of our plant. This hub is trebly laminated over its entire area, with the materials so disposed as to direction of grain, etc., that it makes without doubt the strongest hub that can be built in any propeller regardless of the number of blades. In repeated cases of wreck or accident all the blades of these propellers have been wholly torn away, leaving the hubs always intact.

In addition to its superior strength a three-bladed propeller, when properly designed, will give a higher degree of efficiency in performance than a two-bladed propeller.

Included in the exhibit is a set of laminations showing the three-blade hub assembly.

Pattern 198: This is another of our three-bladed designs and is built for the Liberty-motored DeHaviland machine. This propeller has all the advantages characteristic of the Paragon Three-blade Propellers.

The A. J. Meyer Mfg. Co.

The A. J. Meyer Mfg. Co. of Hoboken, N. J., exhibits a full line of turnbuckles, showing eight sizes and nine types and also displays a full line of hexagon bolts, ballhead bolts, eyebolts and hinge bolts, hexagon nuts, plain and castellated; clevis pin and various samples of screw machine work. This company has been making aeroplane fittings since 1915 and have supplied all the leading manufacturers of the day.

The firm is represented by A. J. Meyer, H. Denman and G. Diezeman. It is the only firm that does not confine itself to any one article, but has made anything needed in airplane fitting.

Matthews Brothers Mfg. Co.

Matthews Brothers Manufacturing Co. of Milwaukee, Wis., has opened New York offices at No. 52 Vanderbilt avenue. The company's exhibit consists of propellers specially featuring the types manufactured for the U. S. Navy, to be used on huge flying boats of the NC-1, F-5-L, H-16 and HS-2L types, all of which are propelled by 400 H.P. Liberty motors. It also exhibits some smaller propellers, and miniature souvenir propellers made to exact scale of the large Liberty motor propellers.

In addition there is exhibited a N-9 Pontoon that is partially finished; that is, the bottom being left off except at the nose for the purpose of giving the public an opportunity of seeing exactly how the interior members are arranged. The decking is of mahogany and all fittings are nickel plated.

Several of the Matthews propellers are used on planes exhibited at the Exposition. One of the most interesting parts of the exhibit is one that was completely finished and then sawed in sections at six inch intervals along the blade; and also one showing a section parallel to the length of the blade at the position of maximum thickness and neutralization of forces. This gives the aeronautical engineers an opportunity to see not only the high class quality of the work, but also the various shapes at different sections showing how the enormous horsepowers are transmitted.

The exhibit is in charge of Thos. F. Hamilton, General Manager Aircraft Department, who has been prominently identified with the aircraft trade as a designer, constructor and aviator of ten years standing. He is assisted by Mortimer Steinfels, Eastern Representative; E. C. Herrmann and William D. Bird, Factory Representatives.

Edison Electric Appliance Co.

The Edison Electric Appliance Co., Inc., with headquarters in Chicago, is showing at its booth in the Sixty-ninth Regiment Armory electrically-heated clothing for aviators. Among the clothing on exhibition is one of the standard suits as supplied to the Government, which includes a rubberized moleskin coat lined with lamb, an electrically-heated helmet lining of silk jersey, and similar linings for moccasins and gloves. The suit is not heated, for it has been found necessary to heat only the extremities.

The clothing has been designed so that over the helmet lining the aviator straps his leather helmet; over the electrically-heated gloves he places his leather gauntless, while his feet are protected by whatever kind of moccasins he prefers, worn over electrically-heated socks.

To heat his suit each plane is equipped with an air-driven generator, while at a convenient point in each suit there is a miniature switchboard, by means of which the flier can control the heat in any part of his suit. The total wattage required to keep the flier warm is 82 watts, of which 16.8 watts is required for each glove and each moccasin, and 14.4 watts for the helmet.

The Simms Magneto Co.

The Simms Magneto Co. of East Orange, N. J., exhibits the following magnetos:

"C4" and "C6"—They are waterproof magnetos, suitable for four six cylinder engines. Can be furnished with a timing range of 30 degrees, more if necessary. Weight of "C4" ten pounds, "C6 55 10.5 pounds. Driving speed of "C4" 1 to 1, and "C6" 1½ to 1.

"L-8"—This is adapted to eight cylinder high speed aviation motors. The magneto should be driven at crankshaft speed. Weight 13.4 pounds. This is intended for use with a helical sleeve advance. Driving speed 1 to 1.

"L-16"—This is suitable for high speed aviation motors of sixteen cylinders. This magneto should be used in connection with the helical sleeve advance. Weight is 13.11 pounds. Driving speed 1-1/3 to 1.

"L-12"—This magneto is particularly adapted to high speed aviation motors with cylinders set at an angle of 45 or 60 degrees. The weight is 13.11 pounds. The driving speed is 1½ to 1.

"K4" With Impulse Starter—This is particularly adapted to large four cylinder engines. The impulse starter coupling may be fitted to any of our magnetos without any structural change being made. The coupling is small in size, entirely enclosed, and automatic in its engagement and disengagement. It requires no attention whatsoever before starting. The weight of the magneto 14 pounds. The driving speed is 1 to 1. Timing range 30 degrees, more if necessary.

"CK6 Two Spark"—This magneto fires two plugs simultaneously. It is particularly adapted to "T" head engines and where highest efficiency and speed are essential. Timing range 25 degrees. Due to greatly increased flame propagation obtained with two spark instruments the usual timing range is unnecessary. Driving speed is 1½ to 1. Weight 14¾ pounds. The construction generally is especially suited to aeronautical work because there is no possibility of the magneto being affected by vibration.

The company is represented by V. W. Kliesrath, Consulting Engineer; A. J. Poole, Sales Manager; L. F. Acker, Ass't Sales Manager; G. M. Rymarczick, Production Engineer; B. W. Babbitt and A. E. Norris.

Anderson Forge and Machine Co.

The Liberty, Bugatti, and Renault crankshaft forgings exhibited by the Anderson Forge and Machine Company at Booth 341, Madison Square Garden balcony, call particular attention to the progress made in difficult forging work during the war period.

The forged and finished crankshafts are a product of the best grade of materials and highest workmanship obtainable and are representative of the type of perfect forgings demanded by the aeronautical and automobile industries today.

W. E. Snyder, representing the sales department, is in charge of the Anderson Forge and Machine Company booth.

Radium Dial Co.

The exhibit of the Radium Dial Co. includes an interesting display of instruments treated with Luma, the radium illuminated compound. Speedometers, compass, clocks, inclinometers, barometers, gas and oil gauges, etc., were shown in a special dark room to which interested visitors were invited. The display also included humalite push switch buttons, pull chain sockets, navigating instruments, gunsights and signs. The booth was in charge of G. G. Truesdale.

Stone Propeller Co.

The Stone Propeller Company, of Dayton, O., is showing a number of different types of "Supreme" propellers. M. J. Stone is representing his company at the Exposition.

LOS ANGELES

First Scheduled Co

Just as THE HOUSE OF MARTIN has maintained the
since 1909, and has produced in the MARTIN BOMB

First Regular Con

will be i

THE MARTIN AERIAL FREIGHTER AND TW
engined planes have been ordered by The Apache
struction at the Martin plant. They will maintain a
and San Diego, California.

THE GLENN L.

CLEV

CONTRACTORS TO

SAN DIEGO

mercial Air Service

premacy of performance and dependability of its airplanes
the most important aerial development of the war, so the

ercial Air Service

urated by

VE PASSENGER AIRPLANE. Four of these twin-
al Transportation Company and are now under con-
hourly service in both directions between Los Angeles

ARTIN COMPANY

LAND

U. S. GOVERNMENT

Teaching Aviators to Shoot by Camera

How is it possible to tell whether one aviator scores a hit on another when the fighting is make-believe as at training fields? It is needess to say that real bullets are out of the question. Yet accurate and speedy shooting is next to expert flying the essential of all essentials in a war aviator's repertoire. The answer to the question is wrapped up in another one of those interesting phases of mechanical and inventive genius that has so helped to place the Allies on top, particularly so since America jumped into the fray. Photography was brought into play by means of a special camera which can take the place on a Lewis machine gun of the cartridge magazine with operating conditions exactly the same as in shooting real bullets. This gun camera was designed by Americans in a strictly American factory, and a picture is made for every bullet that would have been fired, showing the exact position of the opponent's aeroplane at the time of firing and thus determining whether the 'plane would have been hit in a vital area or not.

At the time of the entrance of the United States into the war British aviators were using a gun camera patterned after a Lewis machine gun with a long lens barrel substituted for the shooting of the machine gun. This camera was designed to make 12 exposures at one loading, and for each exposure a manual operation was required. In other words, the aviator could only make one shot at a time and twelve shots before he would have to reload. With the true co-operative spirit that was evinced by all the Allies, and especially Great Britain, in giving us the benefits of their previous experiences in the war the British authorities turned this gun camera over to our army men who in turn gave the Eastman Kodak Company orders to make duplicates of it.

It was here that Yankee initiative, which has always been so much in evidence in national emergencies and which refuses to be satisfied with what has gone on before, sprang to the front. One of the Kodak managers at once questioned the need of a heavy separate gun camera with its big lens barrel. Why not have a special camera attachment that could be fastened to the gun itself that the aviator is continually using? The engineering department of the Kodak Company was given the job of answering the question—and they did it as the accompanying illustrations will prove. Not only did they build a camera that could be attached directly to the gun in place of the ordinary ammunition magazine, but they produced a camera that could not merely make 100 exposures on one loading—that is, a number equivalent to 100 rounds of ammunition, but, like the machine gun itself, fire in "bursts"—this is, continue firing automatically as long as the trigger is under pressure.

The Gun Camera, Mark 1, as it is officially called, weighs 13 pounds all told, and has a lens barrel only eight inches long and two and one-half inches in diameter. It is of metal construction throughout. The magazine of the camera in which is placed a strip of film instead of being circular, as is the cartridge magazine of the machine gun, is oval-shaped; it is fitted with a Lewis gun magazine lock, which completely fastens the magazine to the gun camera.

Each gun camera is ordinarily provided with three magazines which are loaded in a dark room. If an embryo fighting aviator, therefore, takes up with him these three magazines loaded to capacity, he can "shoot" 300 times. The film in the magazine is ordinary motion-picture film which travels from a spool in the small end of the magizine past a light trap, where it is exposed, to a reel five inches in diameter in the larger end of the magazine. The magazine is 10¾ inches long and 8 inches wide at the larger end.

Now in the Lewis machine gun after a bullet has been fired the gasses resulting from the recoil eject the empty cartridge and automatically replace a loaded cartridge, so in order to continue firing all one needs to do is to continue pressure on the trigger. With the gun camera something must be substituted for the force of the cartridge charge, and so use is made of a spring which is wound up with a handle similar to that employed in winding up talking-machine motors. The spring is fastened directly to the shaft that turns the 5-inch reel and through a mechanism, called a Geneva movement, which causes an intermittent action, to the shutter mechanism in the lens barrel. Thus, as the film is moved steadily past the light trap, the shutter opens and closes for making the various exposures to show the location of the opposing aeroplane, each opening occurring at the time a machine-gun bullet would have been fired.

To facilitate spotting the shot from the gun camera, a glass plate called a graticule is placed in the barrel at the focal plane in contact with the film. This plate is marked with a vertical and horizontal line passing through the center and one small circle which one might say indicates the bull's eye and two large circles drawn close together describing the outer field covered by the camera. These circles and bisecting lines are impressed on the film at each exposure and the position of the opponent airplane is indicated by means of them.

Of course, one must realize that in aerial fights machines are going at tremendous speeds, and the position of the opposing machine at the time of firing a bullet (making exposure) is not quite the same as at the time the bullet reaches the machine. One can tell, however, fairly well by the direction the opposing airplane was going as shown on the film whether it would have been hit in a vital spot or not. Thus, if the machine is pointed toward the center or bisection of the lines and is very close to the bisection, the chances of its having been hit would have been very good. If the machine had been shown in the same position with regard to the center point but going away from it, the margin of speed would probably just about have saved it from being hit. In a straight pursuit a hit is indicated when some vital part of the machine covers up the center of the field. How the opposing airplane is shown in flight in relation to the lines of the graticule in the gun camera is indicated in an illustration which is a reproduction of a strip of film exposed in the gun camera from another airplane.

The gun camera is registered properly in relation to the sights of the m chine gun to which it is attached by first sighting the machine-gun sight on some definite point a certain distance away and then moving the camera so the poin of the bisecting lines of the graticule fall exactly on the point on which the gun was sighted. The camera is then clamped securely to the machine gun.

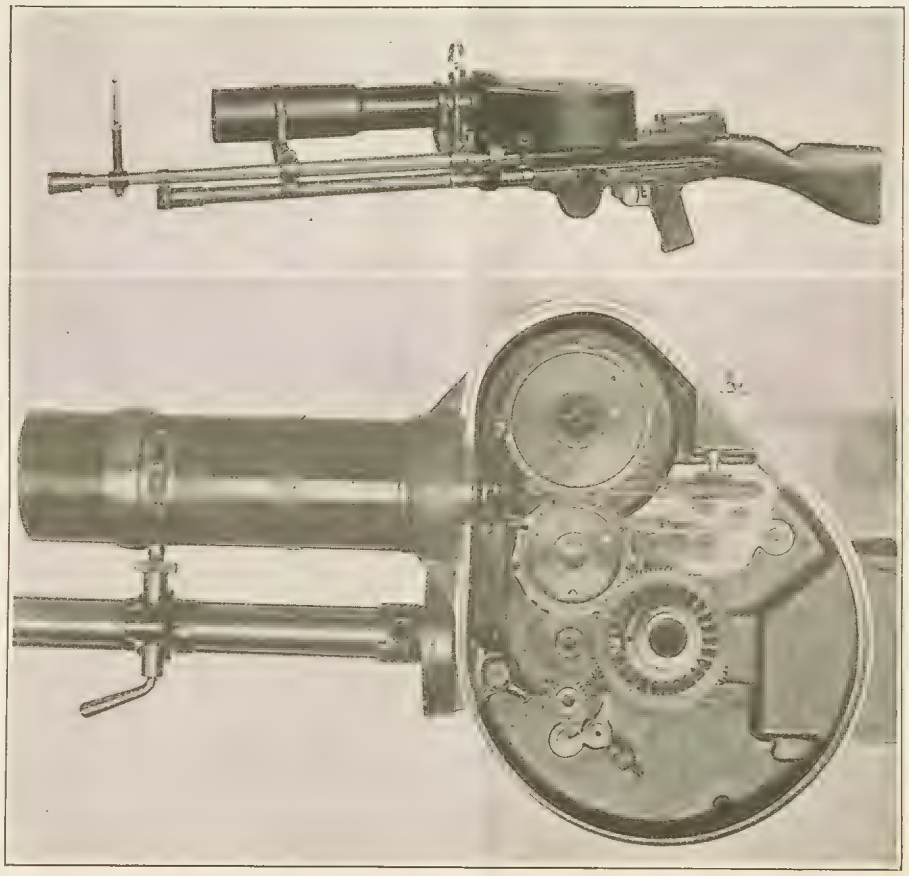
The advantages of a device such the camera attachment for Lewis machine-guns described to give fighting aviators necessary target practice u der combat conditions are only too self-evident.

The latest development of this gun camera is a timing attachment whereby a photograph of a watch face is made at the airplane. It thus does same identical instant that the snap is made at the aeroplane. It thus does three things at the same time: records from the graticule the image of a target, shows what part of the target the competing airplane was on and shows the time (to a split second) when the plane was there. By this device it is shown, if two airplanes are out to "get" each other photographically, which one snap-shotted the other first and therefore which one was winner in the contest.

Capt. Theodore Arter of the Lawrence Sperry Aircraft Co.

The Lawrence Sperry Aircraft Co. of Farmingdale, Long Island, is showing at its booth in the Sixty-ninth Regiment Armory several of its W. B B. Aeromotors, which they are prepared to deliver in single or quantity orders. The W. B. B. Aeromotor is a four-cylinder, V-type, air-cooled motor, developing 38 hp. Its weight is slightly under 130 lb., and its consumption of gasoline is 6 gal. per hour. The motor sells at $550.

Capt. Theodore Arter, general manager of the company, is in charge of the Sperry booth. Captain Arter was formerly officer in charge of experimental flying at Langley Field.



The Gun Camera, Mark 1—Made by the Eastman Kodak Co.

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Sterling Engine Co.

The prominence of the Sterling Engine Company, manufacturers of marine engines, through the fact that they powered so many of the motor craft connected with seaplane stations, led to the special request that this company exhibit at the Aeronautical Exposition. The company has acceded to the request and has on exhibition one of its 6-cylinder, Model F. 130-145 H.P. engines, also a sectional view of a similar motor, showing the counterbalanced crankshaft feature. The cylinders of this motor have been cut in half longitudinally, so that the complete interior mechanism is exposed. This motor exhibited in this manner is decidedly interesting.

The Sterling exhibit also includes one of the diminutive "Sterling Kid" motors, a 10 H.P., 4-cylinder marine engine, designed for yacht tenders and small high grade runabouts a Model D, 12-15 H.P., heavy duty, 2-cylinder, 4-cycle machine for work boats, life boats, and heavy cruisers. It is said that this motor is capable of driving vessels of from 26 to 68 ft. in length at speeds ranging from 11½ miles to 5 miles per hour respectively. There will also be on exhibition one of the Model E, 17-25 H.P. all-enclosed, 4-cylinder machines, designed for small cruisers and fast runabouts.

The walls about this exhibit carry pictures of typical Sterling powered boats, including some of the most notable patrol boats; also the Miss Detroit II, holder of the world's record, for a 30 nautical mile race, of 56.5 M.P.H. for the distance. This racer also holds the record of 59.3 for the fastest lap (5 miles). The Sterling Company has held the world's record for several years, and has but recently in the Miami races established a new mark for runabouts of M.P.H. on February 22nd. The vessel was Hoosier IV, a 28 ft. x 6 ft. 6 in. runabout, equipped with a Model FS. 130-145 H.P. motor, such as will be on exhibition.

Some of the types of motor craft powered by this company and maintained at seaplane stations are of added interest in that the design of the motors follows certain aircraft practices.

The incorporation of the counterbalanced crankshaft is one of the pronounced features, having been introduced in the marine field by the Sterling Company, which has consistently maintained its product in the van of progress.

One of the pictures on exhibition is the Lynx, S.P. No. 9, which was the first scout patrol to be taken over by the U. S. Government upon declaration of war with Germany. She was immediately started from the Charlestown Navy Yard with a corps of recruiting officers aboard, along the New England coast. The run was most spectacular; the weather being bad and snow storms frequent. Often the Lynx, plastered with icy spray, shut down in harbors bordered by fishing villages. The fishermen could see her out at sea, and her spectacular running undoubtedly secured many recruits. The Lynx measures but 45 x 11 ft., and maintains a speed of 25 M.P.H. with twin 6-cylinder Model F Sterlings, totaling 290 H.P. She is the property of Nathaniel Ayer, Jr., of Boston, and is probably the smallest of the American cruisers to be assigned to foreign waters, as she was later sent to a French seaplane station.

The Sterling Engine Company is represented by C. A. Criqui, President; A. J. Utz, Sales Manager, and M. E. Mutchler, Advertising Manager.

IT IS AN

ACE

THE PRACTICAL AIRPLANE

To meet the requirements of Peace Time flying the Airplane of today must be safe and economical.

SAFETY depends primarily on strength. The ACE has a safety factor of ten; is built to stand many times any strain it can be subjected to. Balance and ease of landing are also essentials. The ACE flies steadily, in perfect balance and lands at such low speed that the ship can be landed in a very small space.

ECONOMY—Cruising radius for 2½ hours, using only ten gallons of gasoline. In performance the ACE shows better economy than the average car. The initial cost must be reasonable without sacrifice of quality. The ACE, because of its small size and quantity production, meets these requirements.

The price is $2,500.

AIRCRAFT ENGINEERING CORPORATION
220 West 42nd Street New York City

ACKERMAN LANDING GEAR

Is the latest and highest development in the construction of Landing Gear

SIMPLICITY STRENGTH and SERVICE

make them the logical equipment for the Modern Airplane

Weight [illegible] pounds complete with [illegible] built for craft weighing 2500 [illegible]

WHEELS and LANDING GEAR built for any size machine

Complete [illegible] Ackerman Equipment [illegible] available for Designers [illegible] Engineers

THE ACKERMAN WHEEL COMPANY
542 Rockefeller Building, CLEVELAND, OHIO. U.S.A.

Titeflex Metal Hose Corp.

This company has brought out a patented and special unpacked, absolutely tight, all metal tubing that is flexible in the metal itself instead of the movement and the slipping of a joint as in the case of the ordinary type of flexible metal tubing which is generally known as "Interlocked" tubing. It has never been possible before the introduction of this tubing to obtain a material that would successfully handle very high pressures, and one that would give a satisfactory degree of durability, and while this new tubing is slightly more in first cost, it proves itself to be most economical to use through giving longer life in service.

The manufacturers whole facilities were given over to the Government during the war to supply this product to the various departments, and in a number of instances it was found to be the only tubing that could satisfactorily meet the drastic requirements in the special installations that were made.

The Bureau of Aircraft Production used an assembly of this tubing with fittings as an all-metal gasoline feed line from the fuel supply tank to the carburetor on various planes, and the Bureau of Steam Engineering of the U. S. Navy equipped several types of seaplanes and dirigibles with this tubing for conveying gasoline oil and air. It is a noteworthy fact that the Caproni in the service of the Italian Government were considering the use of this material in connection with their plane work at the time of the closing of the war.

Additional uses by the United States Government were as gasoline, oil, water and air lines on standardized trucks, caterpillar type of tractors, battle tanks, heavy mobile gun mounts, etc. The tubing lends itself to many interesting uses, one which illustrates its adaptability being that of the Eastman Kodak Co., employing it as a protecting housing around a revolving shaft on airplane cameras.

The company is identified with Westinghouse interests, H. H. Westinghouse being Chairman of the Board of Directors, and its official personnel is composed of C. W. Fletcher, President and General Manager, H. R. Smith, Secretary and Treasurer, W. H. Fulton, Chief Engineer and C. E. Mackay, Director of Sales. The General Office and Works of the company are at Badger Avenue and Runyon Street, Newark, N. J., where the plant facilities of the Organization are modern and of large capacity and with space in reserve for expansion.

Motor Compressor Corp.

The Motor Compressor Co. of Newark, N. J., has on exhibition on the gallery at Madison Square Garden one of the Liberty Starters with which Navy planes were equipped. The Liberty Starter is an air motor for starting and a compressor to store air for its own energy in starting. It is entirely self-contained and is designed for coupling to the end of the motor crankshaft. The starter needs no alteration in the motor or gear reduction and has ample power for starting the magneto.

The Liberty Starter, which will crank motors up to 500 hp., weighs 49 lb. complete.

Gallaudet Aircraft Corporation

This company's exhibit consists of the the Gallaudet D-4 light bomber seaplane and its new offering to the world of outdoor sports, the Gallaudet "Chummy Flyabout."

The Gallaudet company is represented by Frank B. Rhodes, and its sales representatives are F. Gates Porter, H. W. Barker and W. L. Baker.

Concerning Anti-Freezing Mixtures

The Motor Transport Branch, Supply Section, O.D.M.A., is in receipt of latest reports on anti-freezing mixtures for radiators from the U. S. Bureau of Standards. This information is on file in this Branch and is available to anyone interested.

U.S.

U. S. Letters for collar insignia
as prescribed by General
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FOR ALL OFFICERS
OF THE
UNITED STATES ARMY

Bronze of best quality with safety catch, 60 cents per set; without safety catch, 50 cents per set. Ready for immediate shipment.

The official standard samples on file with the War Department were manufactured by this Company.

Bailey, Banks & Biddle Co.
PHILADELPHIA, PA.

L·W·F ENGINEERING COMPANY
Inc.
COLLEGE POINT, L. I.

Aeromarine Plane & Motor Co.

The Aeromarine Limousine Flying Boat and two engines, the Model L six-cylinder and the Model B eight-cylinder, which are attracting considerable attention, comprise the exhibit of the Aeromarine Plane and Motor Co., on the main floor at Madison Square Garden.

The Aeromarine Limousine Flying Boat is for three passengers, two side by side, with the pilot in a separate cockpit forward of the passengers. The model is 40-T and is very similar to the Aeromarine Model 40-T, which is an exceptionally easy craft to handle and is very stable both in the air and in alighting on or rising from the water.

The Model L motor is a six-cylinder, four-cycle, water-cooled, valve-in-the-head type, with a bore of 4.25 in., a stroke of 6.5 in., and a weight of 375 lb. Its rated horsepower is 130 at 1,625 r.p.m.

The Model B is an eight-cylinder engine that is rated at 130 hp. It is designed primarily to combine the elements of power and strength with lightness, while at the same time giving due consideration to the questions of simplicity, compactness, adaptability, and manufacturing possibilities.

Major Philip J. Roosevelt Home

Major Philip J. Roosevelt returned to duty in the United States last Tuesday.

While overseas he was Operations Officer of First Pursuit Group; later of the First Army and finally Operations Officer of the First Pursuit Wing, First Army. He was decorated with the *Croix de Guerre* at Chateau-Thierry in July, 1918, and served with the American Air Force in the St. Mihel and Argonne offensives.

In 1916 Major Roosevelt was corporal of the First Aero Company, New York National Guard. Before entering the service Major Roosevelt was Military Editor of *Aviation* and *Aeronautical Engineering*.

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The only regulation size sterling silver three piece insignia made in the U. S. A. For sale at all Exchanges
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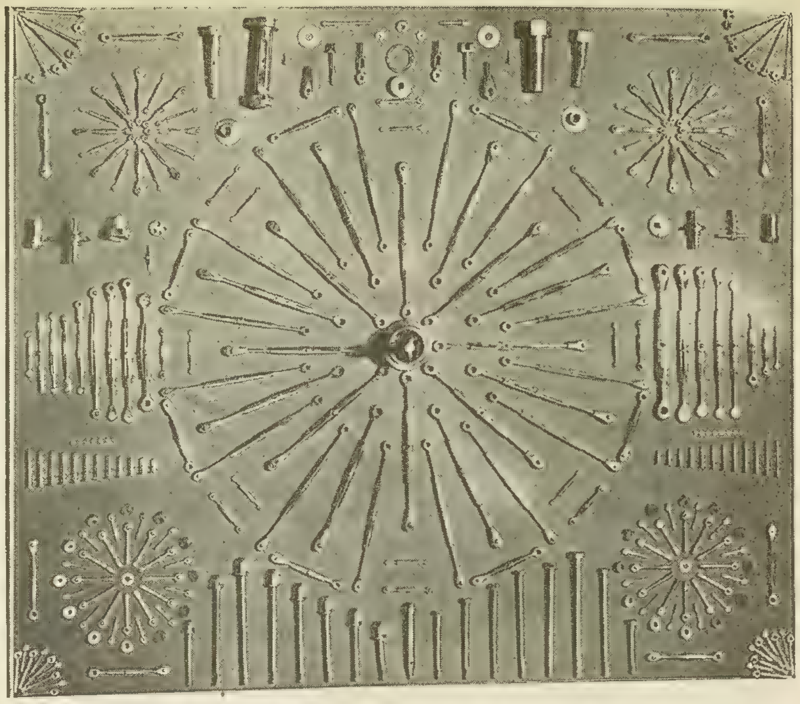

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Forged Ends or Machined from Bar Stock
Bolts Ball Head, Hexagon, Eye bolts
Washers Flat, Taper (any angle)
Nuts Plain, Hexagon, Castellated
Clevis Pins *Wing Hinge Pins*
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WEST HOBOKEN, N. J.

Thomas
THOMAS-MORSE AIRCRAFT CORPORATION
CONTRACTORS TO THE U.S. GOVERNMENT
ITHACA, N.Y. U.S.A.

An Achievement

WHEN, thru coming years, the big things of The Great War shall stand out in retrospective review, the truth will be realized that, in the forefront of achievements of dominating and lasting value and influence, the necessity of the hour gave to the world the development of the Airplane on a quantity production basis.

And thus a new industry was born. Some years before, two brothers in Dayton had invented, developed and produced a few successful heavier-than-air machines. It is with a feeling of just pride that—from a manufacturing standpoint—we can now look back over recent events and realize our achievement, along with that of so many others; and—

FOUR FACTS LOOM UP PREDOMINANTLY

1. The FIRST American-built battle plane was turned out by the Dayton-Wright Airplane Co.
2. The first planes this country sent to France were made in—and shipped from—our factory in Dayton.
3. We made and shipped over 80% of all the American-built battle planes that ever reached the Front.
4. The Dayton-Wright Airplane Co. produced more planes per day than any other plant in the world.

There were no precedents to guide the way. The thing had never been done before. But the issue was met—a new industry was born—the Airplane was made a manufacturing possibility on a quantity production basis. An interesting story of this work—in an attractive booklet entitled "An Achievement"—furnished free on request to those who may be interested.

The Dayton-Wright Airplane Company
DAYTON, OHIO
(The Birthplace of the Airplane)

BRITAIN'S BIG AIRSHIP ON TEST FLIGHT

R-33, Which Soon Will Try to Cross the Atlantic

SPEED 70 MILES AN HOUR

Carries a Crew of Thirty and Gasoline Enough for a Cruise of 4800 Miles

Great Britain's biggest airship, said to be the largest in the world and the one with which an attempt to fly across the Atlantic is to be made shortly, rose for her first trial flights shortly after dawn March 8.

Swaying gently in a strong head wind she rose immediately and at 300 feet started eastward at seventy miles an hour. She was sighted at Hull, thirty miles east, well under half an hour after the launching.

Builder Won Race

Some months ago the British Admiralty placed orders for similar ships with two large contracting firms—Beardmore, on the Clyde, and Armstrong-Whitworth, at Barrow, in Furness. The latter won the strenuous race to be first in the air with the R-33.

The airship, which is of the rigid type, was constructed for war purposes, the sinister indications whereof are manifested by openings in the underbody through which can be dropped four 800 pound and sixteen 120 pound bombs, and by provision in the upper works for eight guns.

The ship carries gasolene for an eighty hour flight at an average speed of sixty miles an hour. There are five twelve cylinder engines of 250 hp. each. One of these is forward, one on each side of the cabin and two are aft, the latter driving a propeller nineteen feet in diameter, while the single engines drive sixteen foot propellers.

Crew Has Luxuries

Aboard there is every luxury for the crew, numbering thirty. There is a patent cooking apparatus on which eggs can be boiled by the hot water from the engine jackets.

Shortly after dawn the R-33 was hauled from her great new shed, visible for miles around. It took 160 men nearly an hour to open the four great doors, each of which weighs 700 tons.

The nose of the ship is painted with the familiar red, white and blue rings and a lucky horseshoe is suspended from her prow.

Colonel Hicks was in charge of the trial flight as pilot and Major Thomas was the captain of the ship. With a man placed in the little conning tower at the rear and others of the crew in their places hundreds of willing hands pulled her outside and headed her into the wind. Then the great propellers were started and the R-33 rose majestically into the air.

She Wished She Had Studied Plumbing

The display by the Zenith Carburetor Co. at the Garden attracts a large crowd daily. Among the interested, but unknowing and unitiated, are many women and children. The other day a woman and her young son, a bright youngster of ten, stopped at the booth and the little chap began to explain to his mother the working of the carburetor. When the explanation was nearly finished the mother burst out with: "Oh, how I wish I had studied plumbing so that I could understand it all."

Expansion of the Air Mail Service

Extension of the aero mail service between New York and Chicage, regular operation of which is expected this spring, was promised March 10 by Otto Praeger, Second Assistant Postmaster General, who was the guest of honor at the aeronautical exposition.

Mr. Praeger said that with the $850,500 appropriated recently by Congress the air mail service would be extended from Chicago to Omaha, Minneapolis and St. Paul.

Eighteen ships, he said, are under construction for the New York to Chicago service and delivery is promised by April 15.

Captain Sykes to Return Home

Capt. George Sykes, R. A. F., A. M. I. E. E., who has been in this country nearly four years, attached to the British War Mission in a commercial capacity, sails for Europe in May. He has joined Messrs. Dutilh-Smith McMillan Co., an International House, as London manager of their engineering and railroad departments. His New York address is 50 Broad Street, and his London office is Central Buildings, Totehill Street, Westminster.

Classified Advertisements

Rates, 25 cents per agate line per insertion. Black face type, 50 cents per agate line. Every advertisement will be repeated free of charge in **Aviation and Aeronautical Engineering.** Forms close Saturday preceding date of publication.

FOR SALE—Large stock of Airplane Material of every description. Standard Aircraft Corporation, Elizabeth, N. J.

HALL SCOTT A-7 MOTOR FOR SALE—100 H. P. Aviation Motor—New, run only fifteen hours—has PERFECT STARTER. An ideal motor for Flying Boat or Land Machine—Immediate delivery. For particulars write Box 209.

FOR SALE—One observation kite balloon with carrying capacity about 175 lbs. Fourteen parachutes go with it. Excellent condition. Box 108.

AERONAUTICAL RIGGER with experience in U. S. Air Service desires position with reliable concern or party. Will consider offers for rigging and keeping privately owned airplanes in commission. Leo deRoo, Honolulu, Hawaii.

AEROPLANE DESIGNER
(Associate Member of the Institute of Naval Architects and Associate Fellow of the Royal Aeronautical Society and author of scientific work),
AIRCRAFT WORKS MANAGER
(Associate Member of the Institute of Automobile Engineers and pilot aviator),
jointy responsible for seaplane and aeroplane productions of large English firm during the war, and having latest methods and data, are, owing to British Labor unrest, desirous of associating themselves with large progressive firm in United States. Communicate with C. G. Grey, Editor "The Aeroplane," 166 Piccadilly, London, W. 1.

The United Aircraft Engineering Corporation

52 Vanderbilt Avenue New York City

JUST OFF THE PRESS

Aeronautical Engineering and Airplane Design

By

LIEUTENANT ALEXANDER KLEMIN

Air Service, Aircraft Production, U. S. A., in Charge Aeronautical Research Department, Airplane Engineering Department. Until entering military service in the Department of Aeronautics, Massachusetts Institute of Technology, and Technical Editor of *Aviation and Aeronautical Engineering*. In two parts.

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Resistance Computations—Preliminary Wing Selections

Part 2. Airplane Design

Classification of Main Data for Modern Airplanes; Unarmed Land Reconnaissance Machines; Land Training Machines
Land Pursuit Machine; Land Gun-Carrying Machine; Twin-Engined All-round Machine
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THE GARDNER-MOFFAT COMPANY, Inc., Publishers
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STANDARD'S WINGS OF WAR
1917-1918

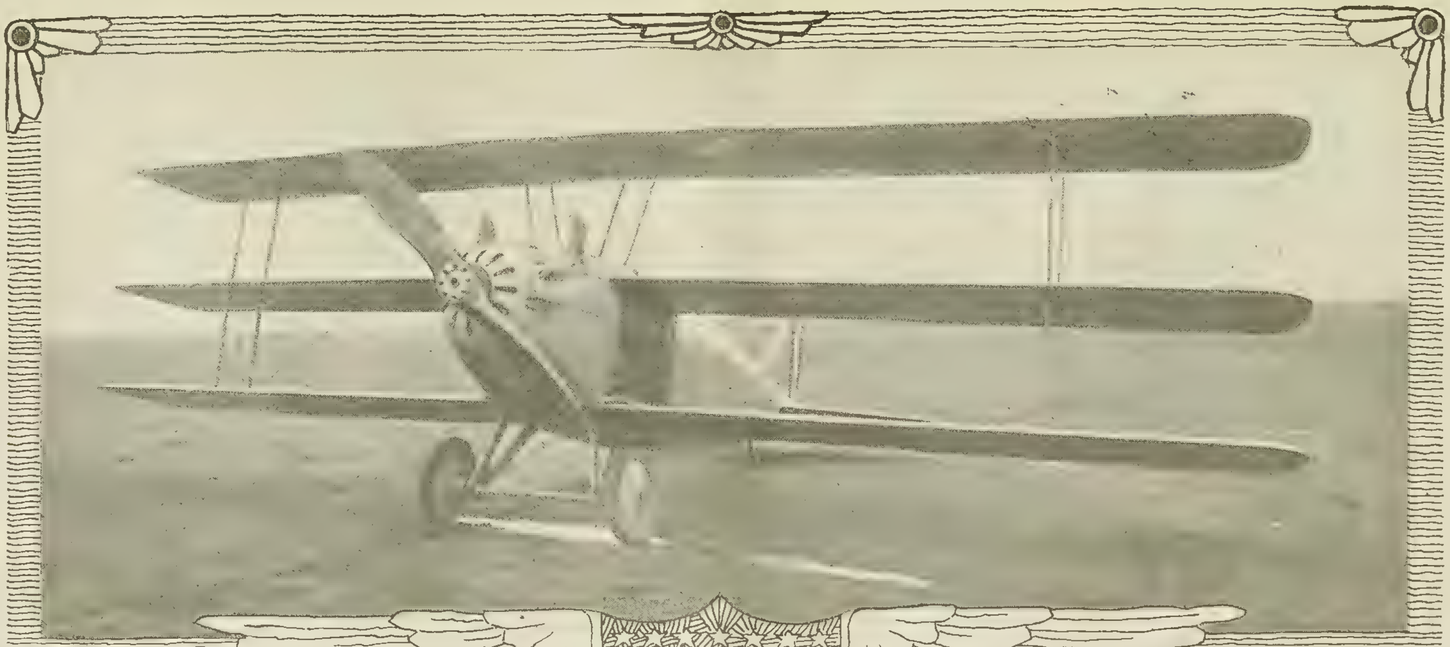
A Record Unequaled in Our Aeronautical Annals —

All of these Planes were Developed & Produced between April 4 1917 and November 11 1918 by

STANDARD AIRCRAFT CORPORATION

"A REAL FIGHTING INDUSTRY"

A Unit of The Elizabeth, N. J. Plant



THE CURTISS MODEL-18 TRIPLANE, the fastest aeroplane in the world to-day. Government tests credit it with an official horizontal speed of 160 miles per hour with full military load of 1100 lbs.

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Sales Offices: 52 Vanderbilt Avenue, New York City

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Garden City, Long Island

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Marblehead, Mass.

COMMERCIAL—SPORTING—MILITARY—NAVAL

AIR SERVICE JOURNAL

The National Aeronautic Newspaper

VOL. IV. No. 12 NEW YORK, MARCH 22, 1919 PRICE 10 CENTS

Smithsonian Institution MAR 24 1919 Office Library

$100,000,000 FOR THE A. S. FIVE MONTHS

Gen. J. E. B. Seeley's Announcement in the House of Commons

102 DEFENSE SQUADRONS

Air Ministry Will Try in Paris to Secure an International Agreement with Regard to the Future of Flying

During the war 8000 enemy airplanes were shot down by the British air forces, while 2800 British machines were missing, Brig. Gen. J. E. B. Seeley announced in the House of Commons March 13, in introducing the army's air estimates of £66,000,000.

A White Paper on the air estimates votes states that the maximum personnel of the British air force on any day covered by the estimates is 150,000. This number, however, is in process of reduction to 79,570, which is the total number of all ranks in the air service to be retained during the period of occupation. This number, which will soon be reached by demobilization, includes the Rhine army and the troops in France and Belgium, with a total of 17,420, the armies of the Middle East, 3,180, and the home and colnial establishments, including Russia and men with the Grand Fleet, 58,970.

The vote on account requires £20,000,000 for the air services for the first five months of the fiscal year 1919-20.

General Seeley announced that it was intended to keep 102 squadrons for defense, but the country would not rely so much on the number of machines as in remaining in the forefront of aerial development. Air forces, he added, would be maintained in Egypt, Mesopotamia, Archangel, and the Near and Middle East. He pointed out that the political officer at Bagdad would be able by airplane to carry out in two days the same number of inspections to secure continuous friendly relations with the inhabitants as would previously have taken two months. A large part of the estimate would be available for the encouragement of civilian aviation.

The first duty of the new civilian branch of the Air Ministry would be to secure an international agreement in Paris with regard to the future of flying, which must always in many respects be an international business, because there are no natural boundaries.

Dilating on the enormous scientific development in aviation, including the discovery of the wireless telephone, by which aviators are able both to send and receive from the same operator, General Seeley mentioned an entirely novel type of aircraft which is under consideration, and which, he said, mathematicians claimed could attain hitherto unheard-of speed.

Allied Air Raids Slew 729

Seven hundred and twenty-nine persons were killed and 1,754 were injured in aerial attacks by allied forces on German territory up to Nov. 6, 1918, according to official figures made public in Berlin.

Chart of Executive Staff Functions

The following chart explains the various functions of the Executive Staff:

DIRECTOR OF
AIR SERVICE

EXECUTIVE OFFICER
Advisory Board ....Col. M. F. Davis......Foreign Representation
(to be announced later)

Col. W. A. Kilner
Col. A. L. Fuller
Col. H. C. Pratt
Lieut.-Col. G. B. Hunter
Lieute.-Col. H. W. Harms
Major C. R. Cameron

EXECUTIVE STAFF

1st Asst. Executive Col. W. E. Gillmore	2nd Asst. Exec'tive Maj. H. M. Hickam	3d Asst. Executive Br.-Gen. W. Mitchell	4th Asst. Executive Lt.-Col. W.F. Pearson
Technical Advisory Staff: Supply Chief, A. S. Prop'ty, Lt.-Col. A.W. Robins Chief, A. S. Procurement Col. C. G. Hall Chief, A. S. Materiel Inspection Lt.-Col. A. C. Downey Chief, A. S. Aero. Eng'r. Col. T. H. Bane	Information Statistics Publicity	Tech. Ad'sory Staff: Training & Op'tions Chief, A. S. Training (to be announced later) Chief, A. S. Operations, Lt.-Col. L. H. Brereton Chief, A. S. Gunnery, Lt.-Col. H. E. Hartney Chief, A. S. Communications, Col. C. C. Culver Chief, A. S. Balloons & Airships, Col. C. DeF. Chandler	ADMINISTRATIVE STAFF Chief, A. S. Personnel, Col. R. B. Lincoln Chief, A. S. Insp'tor, Lt.-Col. F. M. Andrews Chief Surgeon, A. S. Col. A. E. Truby, M. C. ROUTINE EXECUTIVE A. S. Functions

LOOKS FOR EARLY TRIP OVERSEAS

Admiral Taylor Talks of the Navy's Transatlantic Flight

The Navy's projected transatlantic flight awaits onlythe alteration of the flying boats now under construction at NC-1 flying boats now under construction at the Curtiss plant at Garden City. These ships should be ready in a short time and then the weather will be the controlling factor.

Before leaving for overseas Admiral Taylor, chief constructor for the Navy, gave some interesting information regarding the plans for the flight.

"America," Admiral Taylor said, "will be ready in a month to fly across the Atlantic. I do not believe that Great Britain will beat us across, that is, if the attempt is made with heavier than air craft. We are under the impression, however, that a dirigible trip will be undertaken, possibly within the coming week.

"The Navy has four boats of the NC-1 type and work on these crafts. I understated, has been almost completed. It has not yet been decided whether all four will be sent over at the same time, but I believe that when the time comes more than one will start. This will be an insurance against entire failure in the event one or two of the machines break down."

SETBACK FOR ATLANTIC CITY AERO SHOW

Aircraft Manufacturers Won't Be at the Steel Pier

During the last week of the Aero Show the announcement was made of the Second Pan-American Aeronautic Exposition to be held at Atlantic City during the month of May at the Steel Pier, under the auspices of the Aerial League of America, Aero Club of America and the Pan-American Aeronautic Federation.

Contracts for space at the Exposition were distributed by the "Show Committee of the Aerial League of America, Inc." The matter was taken up by the Manufacturers Aircraft Association which is composed of the following companies:

Curtiss Aeroplane and Motor Corporation.
Aeromarine Plane and Motor Co.
The Burgess Co.
Dayton-Wright Airplane Co.
L. W. F. Engineering Co.
Standard Aero Corporation.
Sturtevant Aeroplane Co.
Thomas-Morse Artcraft Corporation, and Wright-Martin Aircraft Corporation.

After careful consideration the President of the Association, Frank H. Russell, President of the Curtiss Engineering Corporation, wrote to the committee

(Continued on page 5)

AIR SERVICE REORGANIZED ON NEW LINES

Modification of the "G" Plan Is Announced in G. O. No. 1

HOW DUTIES ARE DIVIDED

Officers Designated as Members of the Advisory Board and for Duty in the Office of the D. A. S.

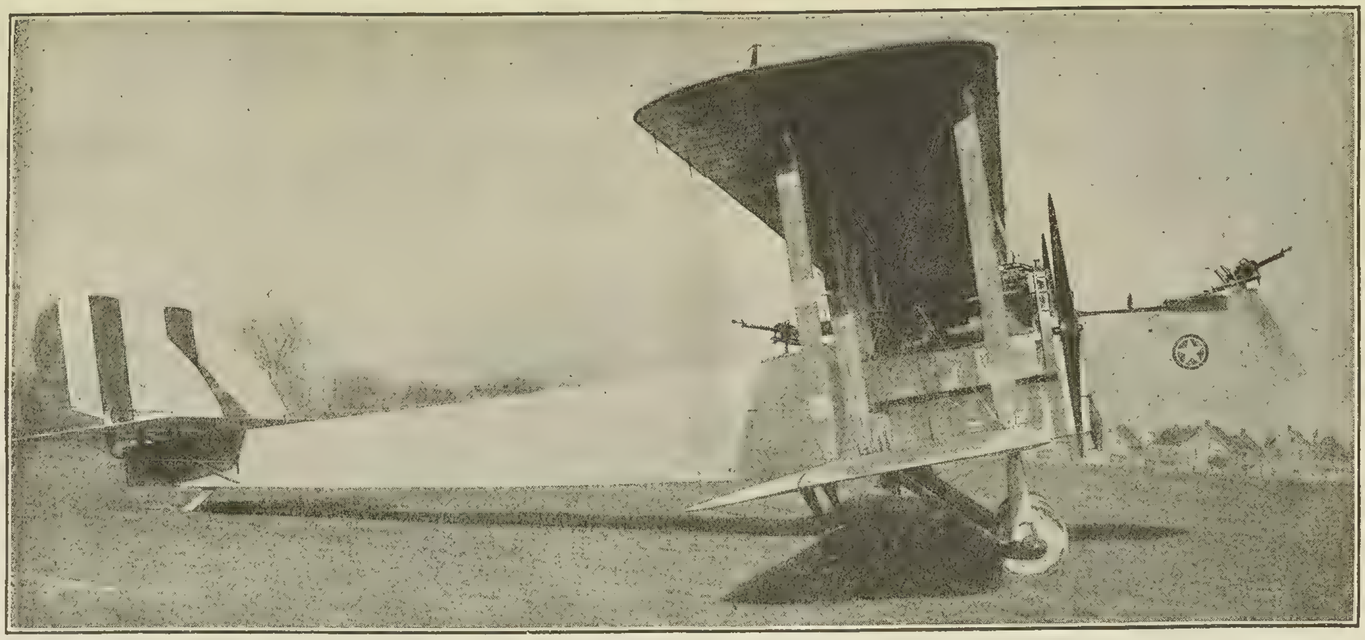
Since Gen. Wm. L. Kenly has been relieved as Director of Military Aeronautics, the Air Service has been reorganized along lines which is known in the A. E. F. as the "G" plan. This division of duties divides the functions of the Staff of a Headquarters, Army, or Division into four or five sections, Administration, Intelligence, Operations, Supply and Training.

Plan of Reorganization

A modification of this plan is announced in General Orders No. 1 of the Director of Air Service as follows:

> The Director of Air Service hereby announces his assumption of the duties and responsibilities precribed for him in Section 4, General Orders No. 19, War Department, Jan. 29.
>
> The Division of Military Aeronautics and the Bureau of Aircraft Production, having been created pursuant to the provisions of an Executive Order dated May 20, 1918, will continue to function, except as hereinafter provided. In order, however, that the functions of the Air Service prescribed in Article LXXXI, Army Regulations, 1913, may be properly carried out, the activities of these Bureaus will be co-ordinated and directed from the office of the Director of Air Service, in the manner hereinafter stated.
>
> The Directors of Military Aeronautics and of Aircraft Production are designated as Assistants to the Director of Air Service for their respective bureaus.
>
> The office of the Director of Air Service will consist of:
>
> *An Executive Staff*, composed of an Executive Officer and four assistants, known as First, Second, Third and Fourth Assistant Executives, respectively.
>
> EXECUTIVE STAFF
>
> Executive Officer, Col. Milton F. Davis, A. S., A.
>
> First Assistant Executive, Col. William E. Gillmore, A. S., A.
>
> Second Assistant Executive, Major Horace M. Hickam, A. S., A.
>
> Third Assistant Executive, Brig.-Gen. William Mitchell, U. S. A.
>
> Fourth Assistant Executive, Lieut.-Col. William F. Pearson, A. S., A.
>
> *A Technical Advisory Staff*, consisting of the following:
>
> Supply Group (corordinated by and under the direction of the First Assistant Executive).
>
> TECHNICAL ADVISORY STAFF
>
> SUPPLY
>
> Chief, Air Service Property, Lieut.-Col. Augustine W. Robins, A. S., A.

(Continued on page 5)



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Air Service Reorganization

The expected reorganization of the Air Service has caused much unfavorable comment in the newspapers owing to the radical changes that it makes both in personnel and departments. That this should occur is due to the fact that so much misinformation has been circulated about the whole aircraft program. Writers with little or no knowledge of army routine express opinions which so distort the facts that the fundamentals are lost in a haze of opinion.

That General Menoher would make changes in the organization was evident from the beginning. The organization of Mr. Ryan in the Bureau of Aircraft Production and that of General Kenly in the Department of Military Aeronautics were war products. They had all the disadvantages of decentralization which led to friction and conflict. The first step taken by the new Director was to secure authority to transfer from one department to the other without higher sanction. The logical second step was to effect a co-ordination of all the Air Service in one organization and this has been done.

In making changes it is evident that a great deal has been taken from the A. E. F. organization plan known as the "G" system, where everything was centralized in a General Staff, and this in turn subdivided into divisions which proved workable under war conditions.

So far as can be seen, very few changes have been made in important departments. A slight rearrangement of duties and new names for old work, together with a revaluation of branches on a peace basis is about the most that has been accomplished. It is evident at once that grouped in the list given out are practically all of the officers in the Air Service who have made a conspicuous success of administrative work.

The Airplane in Agriculture

In connection with scouting and other survey work in Texas, the U. S. Department of Agriculture is putting the airplane to its first practical application in agriculture. A try-out of this method of survey was made last year along the Trinity River and resulted in the discovery of several outlaw cotton fields in heavy timber, which had previously escaped detection. This year the airplane is to be used more extensively. It has been found a valuable aid in pink boll-worm work, as it makes possible the easy mapping, by means of photographs, of the quarantined territory, and facilitates the inspection work in forested areas, especially in such long stretches of country as the valley of the Rio Grande and its tributaries.

It is the use of the airplane for such purposes, and there are thousands of them, that will give the industry an immediate outlet for specialized types. The Bureau of Agriculture can probably find many other uses to which airplanes can be put.

It should be the same in all departments of the Government. The Treasury, with its revenue problems, will find use for machines, the departments of Commerce, Justice and the Interior will all find the airplane of practical value as have the War, Navy and Post Office Departments. The only requirement is that far-seeing officials should be acquainted with the possibilities of air work and then have their imagination stimulated.

Landing Place in Manhattan

High Government and financial officials from now on must make frequent trips in aircraft. There is immediate need for many public landing places. Why cannot some flat land or large fill on Manhattan Island be set aside and prepared for the municipal landing-place? With the small dirigible we shall be able to rent some roof or a ten-acre lot and deliver there, but it is a shame that passengers who are in a greater hurry than seventy miles per hour cannot get closer to the heart of the city than Mineola. Unless some field can be provided close to the city it will be necessary to establish a dirigible local service from Mineola to Manhattan.—*Col. James Prentice, A. S. A.*

Aircraft and Steamships

The possibilities of an aerial adjunct to the steamship business are not difficult to perceive. For instance, a vessel may lose a propeller blade several hundreds of miles at sea. The swift airplane would make for the home port and arrange for help. The contract for this would be made in a business-like way through the company's offices and there would be an immense saving of money. This saving might be as much as $75,000 on a salvage claim. In cases of fire and death of navigation officers it is conceivable that airplane equipment would prove serviceable. I think we will see the airplane extensively used on steamships of all nationalities in the near future.

In the matter of clearances of vessels practical steamship men have been quick to appreciate the value of swift planes in the delivery of final manifests and consignees' papers to the vessels at sea, thus enabling the operators to save the interest of several days' delay on millions of dollars worth of cargo.—*A. E. Clegg.*

DANIELS WILL MAKE STUDY OF AIRCRAFT

One of the Principal Objects of His Trip to Europe

AIMS TO LEAD THE WAY

"Our Problem Is to Advance the Science of Air Navigation," Declares the Secretary of the Navy

Definite plans for extensive experimental work with aircraft are being worked out by the Navy General Board, and in their conferences abroad with officials of the British, French and Italian admiralties. Secretary Daniels and his three chief technical advisers will give particular attention to airchaft development. Congress will be asked later to make a special appropriation for the work.

Mr. Daniels confirmed this outline of the navy's pláns before he sailed March 14 for France. He was joined by Rear Admirals Robert S. Griffin, chief engineer; David W. Taylor, chief constructor, and Ralph Earle, chief of ordnance, who will make the trip with him. He expects to return on May 1, after visiting Paris, London and Rome.

To Keep Ahead of Times

"It is our purpose to keep not only abreast of aviation in the future," Secretary Daniels said, "but to lead the way in its development."

"Now, however, with the stress of war behind us our problem is to advance the science of air navigation, to explore every avenue of possible development, to build better, faster, safer aircraft from year to year, as we build better ships for the navy. For that purpose we must devote ourselves to orderly experiment in peace times. We must keep in touch constantly with what other nations are doing.

"During our stay in Europe we will talk with Admiralty experts on aircraft. Admiral Mayo, who is the navy's representative on the Aircraft Production Board, will organize and direct the expanded campaign of aviation experiment. Abroad Admirals Griffin, Taylor and Earl will have the aid of Capt. Craven, fresh from intensive war time experience with aircraft."

To Formulate Plans

The subject of aircraft development has been fully reviewed by the general board with the three Admirals who are accompanying Secretary Daniels. Information and suggestions arising from the trip will be cabed back to the board in order that the formulation of plans and estimates can go ahead here without delay. In this connection Mr. Daniels said:

"When Congress reconvenes we will have a definite project for aviation experimentation to present. It will require appropriations for which I intend to ask. I am confident that we will find Congress wholly sympathetic with our desire to take a forward looking course and ready to provide liberally the means of carrying on the work."

Dropping Photographs from the Air

A method of dropping photographs from the air so that they will not be injured when hitting the ground is being tried out by the Photographic Branch of the Training Section, D. M. A.

This method consists of placing the photographs in a mailing tube which is left open at both ends and through which a tape fastened at one end is passed. To the other end a weight is attached, which, with the air rushing through the open ends, causes the tube to fall perpendicularly.

Tests have been made at the Army War College and are reported to have proved very successful.

Major Albert S. Sneed, J. M. A., Commanding Officer, Love Field

Major Sneed is a native of Arkansas. He was appointed to the Military Academy at West Point in 1904 and was commissioned a second lieutenant of infantry in 1908. His first service as an officer of the army was in the Philippine Islands, in Moroland, in the Department of Mindanao. He later served in Honolulu, State of Washington, Texas, Arizona and New Mexico borders, Gettysburg, Pa., Cambridge, Mass., and at Rockwell Field, San Diego. At Cambridge he was commanding officer of the United States School of Military Aeronautics, just before taking up his flying instruction in California a year ago. For thirteen years he was an infantryman.

Major Sneed completed an advanced course in aerial gunnery for pursuit pilots at Rockwell Field, San Diego, Cal. He was given his rating as Junior Military Aviator at Rockwell Field prior to his gunnery course there.

Mr. Ryan Gives Some A. S. Figures

John D. Ryan, former Director of the Air Service, in a letter to the New York *Sun* gives some interesting figures which can be regarded as authoritative.

Mr. Ryan states that "the total appropriation for the air service, both aircraft production and military aeronautics, from the time the United States entered the war to June 30, 1918, was $1,578,554,758.

"The latest figures I have been able to obtain on the total obligation entered into for both branches of the air service are $1,365,599,697.

"The credits expected from cancellation of orders, sales of materials, etc., are $400,000,000, so that the total expenditures under these operations will probably be something less than $1,000,000,000 which was used not only for the production in this country and purchase abroad of over 14,000 planes and over 40,000 engines, but covered the cost of training some thousands of aviators, the purchase of fields, the erection of hangars, shops and equipment in this country, in France and England, and everything necessary to complete the air service as it existed at the signing of the armistice.

"Therefore, the statement that equipment costing $1,672,000,000 was to be sold at junk prices and the statement credited to Major La Guardia that we have wasted $1,000,000,000 are most unfortunate and far removed from the truth.

"The statement that spruce costing $800,000,000 is to be sold at a sacrifice is so wide of the mark that I am sure you do not want to let it stand. The facts are these:

"The total net expenditures for the spruce production division amounted to less than $50,000,000. The sales of lumber to the Allies and that furnished to our own air service, as well as the sales of equipment, material, etc., will probably reduce the net loss in the production of spruce to somewhere between $10,000,000 and $15,000,000, of which under the agreement between the United States and the Allies the latter will pay approximately two-thirds.

"When it is taken into consideration that the estimate of spruce needed was raised in May, 1918, from 10,000,000 feet a month to 30,000,000 feet a month, and railroads, saw mills and facilities of all kinds were provided to insure that production—an actual production of 25,000,000 was made in October—and the fact that the whole development and equipment of the spruce production division had of necessity to be liquidated when the armistice was signed, I consider the performance a very creditable one and the loss very small."

Major Petersen's Fatal Short Fall

Major David McK. Petersen, one of America's officially recognized "aces," was killed March 16 in the fall of his airplane at Daytona Beach. His home address is Honesdale, Pa.

The airplane, piloted by Major Petersen, and in which Lieut. F. X. Paversick was a passenger, dropped nose forward after reaching a height of about seventy-five feet while ascending from the beach. Major Petersen was killed instantly and Lieutenant Paversick was injured seriously.

Previous to his enlistment with the American air forces Major Petersen was a member of the Lafayette Escadrille. While connected with the French air service he was unofficially credited with bringing down eighteen German machines. The official report of the War Department shows that Major Petersen brought down five German machines while serving in the American air service.

Major Petersen was the son of Dr. P. B. Petersen, of Honesdale, Coroner of Wayne county, and has been back in this country about six months after serving overseas about two and a half years.

Major Petersen went to France soon after his graduation from Lafayette University to drive an ambulance and later became a member of the famous Lafayette Escadrille, where he served until the United States entered the war. In company with other members of that unit he was transferred to the United States forces, with the rank of lieutenant. Later he was promoted to a captaincy and soon afterward to a major.

Six months ago Major Petersen was sent back to this country with orders to proceed to Gerstner Field, Louisiana, as an instructor.

CONDITIONS OF THE SALE OF U. S. AIRCRAFT

Government Issues a Circular to Govern the Disposal

WHEN U. S. POLICY EVOLVES

Replies Should Be Mailed to the Director of Military Aeronautics, Supply Section, Salvage Branch

The Salvage Branch, Supply Section, Division of Military has issued a circular dated Feb. 15 and just made public conveying "Information relative to disposition of Surplus Air Service Material:"

1. The Salvage Branch, Supply Section, Office of The Director of Military Aeronautics, is disposing of surplus Air Service material from time to time. This material is disposed of—

a. For cash at auction.

b. To the highest bidder on sealed proposals on due public notice and in such market as public interest require.

c. At current market price, if there is an established market for such property, and current market quotations accompany the report of sale, no sale at the market price being made except under continuously maintained competitive conditions and with full publicity.

d. By negotiations under competitive conditions and providing the price obtained is, first,—not less than a price fixed by appraisal, or is, second—the highest of not less than three independent competitive bids.

2. The bulk of this material will be sold at auction or to the highest bidder on sealed proposals. The following is a general classification of the materials to be sold and it is requested that you check the items of material you are particularly interested in so that your firm may be placed upon our mailing list and circular proposals sent you covering such material:

1. Airplanes and parts, (when policy of U. S. is evolved).
2. Bolts, nuts and washers.
3. Building hardware, nails and screws.
4. Cement.
5. Chemicals, acids and drugs.
6. Containers, (drums, etc.)
7. Cotton goods.
8. Dope.
9. Electrical equipment fixtures.
10. Electric motors.
11. Electric wire and cable.
12. Engines, airplane, (when policy of U. S. is evolved).
13. Glass.
14. Hand tools.
15. Instruments.
16. Kitchen equipment.
17. Lumber.
18. Machinery.
19. Machine tools.
20. Metals, all crucible.
21. Miscellaneous.
22. Office equipment and supplies.
23. Paint, oil, varnish and glue.
24. Pipe, cast iron.
25. Plumbing supplies, pipe and pipe fittings.
26. Rope, cord and twine.
27. Steel and iron bars, sheets, etc.
28. Wire, (airplane, cable, etc.)

Replies should be addressed to the Director of Military Aeronautics, Supply Section, Salvage Branch, Washington, D. C.

Major Butts in a Fast Trip

Major John W. Butts, Executive Officer, Souther Field, piloted a De Haviland 4 with Lt. Herbert Blakeslee as passenger from Americus, Ga., to Montgomery, Ala., recently making the distance of 157 miles in ninety minutes, returning in seventy minutes, flying at an elevation of 5000 ft.

Air Service Reorganized on New Lines

(*Continued from page 1*)

Chief, Air Service Procurements In-Col. Chalmers G. Hall, A. S., A.

Chief, Air Service Materials Inspection, Lieut.-Col. George W. Mixter, A. S., A. P.

Chief, Air Service Finance, Lieut.-Col. Alex. C. Downey, A. S., A. P.

Chief, Air Service Aeronautical Engineering, Col. Thurman H. Bane, A. S., A.

Training and Operations Group (co-ordinated by and under the direction of the Third Assistant Executive).

TRAINING AND OPERATIONS

Chief, Air Service Training (Detail to be announced later).

Chief, Air Service Operations, Lieut.-Col Lewis H. Brereton, A. S., A.

Chief, Air Service Gunnery, Lieut.-Col. Harold E. Hartney, A. S., A.

Chief, Air Service Communications, Col. Clarence C. Culver, A. S., A.

Chief, Air Service Balloons and Airships, Col. Charles DeF. Chandler, A. S., A.

An Administrative Staff (co-ordinated by and under the direction of the Fourth Assistant Executive).

ADMINISTRATIVE STAFF

Chief, Air Service Personnel, Lieut.-Col. Rush B. Lincoln, A. S., A.

Chief, Air Service Inspector, Lieut.-Col. Frank M. Andrews, A. S., A.

Chief Surgeon, Air Service, Col. Albert E. Truby, M. C.

Duties Defined

The Executive Officer will be the direct representative of the Director of Air Service in the co-ordination, control and direction of the activities of the Air Service, and in the temporary absence of the Director of Air Service will issue orders in the latter's name.

The functions of the Assistant Executives will be to co-ordinate, control and direct the activities with which each is charged, and, in addition, with the performance of such other duties as may be assigned to them.

The Second Assistant Executive will be specifically charged with matters of information, statistics and publicity.

The Fourth Assistant Executive, in addition to the duties outlined above, will be specifically charged with all routine executive Air Service functions, such as mail, cable and telegraph service, correspondence, central records and files, office administration and confidential records.

The functions of the members of the Technical Advisory and Administrative Staffs will be to co-ordinate, control and direct, in accordance with the policies of this office, those activities of the Division of Military Aeronautics and the Bureau of Aircraft Production corresponding to the duties with which each member is charged in paragraph four above.

To the end that the Air Service may accomplish its functions with a minimum of duplication and delay, each member of the Staff herein provided for, when appointed (or detailed), will at once draw plans for the organization of his office, which plans, subject to the limitations noted, will include the co-ordination and amalgamation of similar activities in the two Bureaus and will submit same to this office for approval and for the necessary instructions to carry them into effect.

In order to accomplish the reorganization outlined above, the personnel, records, files and equipment, or other facilities of the Division of Military Aeronautics and the Bureau of Aircraft Production will be placed at the disposition of this office as and when called upon for by the officer charged with the responsibility therefor.

In accordance with authority granted in a letter from the Adjutant General of the Army, dated Jan. 18, 1919, and in order to accomplish the reorganization as above outlined, this office will make such transfer of the officers from time to time within the Air Service as the interests of the Government require,

Advisory Board

The following named officers have been designated as an Advisory Board, Air Service:

Col. Walter G. Kilner, M. A., A. S., A.

Col. Arthur L. Fuller, A. S., A.

Col. Henry C. Pratt, A. S., A.

Lieut.-Col. George B. Hunter, A. S., A.

Lieut.-Col. Henry W. Harms, J. M. A., A. S., A.

Major Charles R. Cameron, A. S., A., Secretary.

and the following named detailed for duty in the Office of the Director of Air Service, as indicated:

Assistant to Executive Officer, Lieut.-Col. Oscar Westover, A. S., A. P.

Assistant to Second Assistant Executive, Major John B. Reynolds, A. S., A.

Assistant to Third Executive, Col. Thomas DeWitt Milling, M. A., A. S., A.

Assistant to Fourth Assistant Executive, Major Walter H. Frank, J. M. A., A. S., A.

Assistant to Fourth Assistant Executive, Major Raycroft Walsh, J. M. A., A. S., A.

Assistant to Chief, Air Service Materials Inspection, Lieut.-Col. John D. Reardon, A. S., A. P.

Assistant to Chief, Air Service Finance, Lieut.-Col. Jacob E. Fickel, J. M. A., A. S., A.

Assistant to Chief, Air Service Finance, Lieut.-Col. William C. McChord, J. M. A., A. S., A.

Assistant to Chief, Air Service Aeronautical Engineering, Lieut.-Byron Q. Jones, M. A., A. S., A.

Assistant to Chief, Air Service Training, Lieut.-Col. Herbert A. Dargue, M. A., A. S., A.

Assistant to Chief, Air Service Personnel, Lieut.-Col. Hollis C. Clark, A. S., A. P.

Legal Adviser to Director of Air Service, Major J. Gowan Roper, J. A.

Lt.-Col. Thomas Duncan, A. S.

One of the best known "army boys" in the Air Service is the Commanding Officer of Carlstrom Field, Lt.-Col. Thomas Duncan—is the fifth in direct line in his family to be in the Army.

He was born at Vancouver Barracks, Washington. Was commissioned 2nd Lieut. Coast Artillery, April 11, 1905, and promoted to 1st Lieut. Jan. 6, 1907.

Promoted Captain Dec. 31, 1913. Was in the Philippine Islands when the U. S. declared war on Germany where, as C.O. of the 90th Company C.A.C. he supervised the mounting of the first three fourteen-inch guns ever sent to the Orient.

Was appointed Lt.-Col. Aviation Section, Signal Corps, (to date from Aug. 5, 1917), and ordered to the U. S. on Sept. 24, 1917.

Executive Officer, Kelly Field, Tex., from Nov. 23, 1917 to June 26, 1918.

In command of Wilbur Wright Field, Fairfield, Ohio, from June 29, 1918 to Sept. 15, 1918.

Chief of Operations Section, Department of Military Aeronautics from Sept. 16, 1918 to Dec. 10, 1918 when, through cessation of overseas shipments, the section was discontinued.

In command of Eberts Field, Lonoke, Ark., from Dec. 29, 1918 to Jan. 27, 1919.

In command of Carlstrom and Dorr fields, Arcadia, Fla., from Jan. 30, 1919 to present date.

COMMERCIAL PLANES NOT PROHIBITED

Decision Reached by the Supreme War Council in Paris

GERMAN DISARMING TERMS

She Must Construct No More Aircraft Until the Conclusion of Peace, It Is Announced

The aerial terms of the German disarmament as adopted March 12 by the Supreme War Council provide that airplanes and dirigibles shall no longer be used for military purposes. The council concluded that it was not feasible to prohibit airplanes for commercial uses.

The drafting committee was directed to make clear the distinction in the peace terms.

All forms are barred with exception of the use until Oct. 1 of 100 hydroairplanes and 1000 men in gathering mines in the North Sea.

Germany must deliver all airplanes to the Allies and must prohibit the construction of other airplanes until the conclusion of peace, the Supreme Council decided. The terms do not decide the future date of the airplanes which may be either destroyed or divided among the Allies.

The council decided to send an aeronautic commission to Germany to investigate the question of commercial aerial navigation. Deputy Aubigny of the French Chamber will be Chairman.

International Air Service Club

Officers were elected by the members of the International Air Service Club, meeting for the first time in their new home, 9 and 11 East Thirty-eighth Street. Lawrence La T. Driggs was chosen president, Major Gen. Leonard Wood first vice-president, and Capt. Edward Rickenbacker, No. 1 among American aces, second vice-president.

The Directors elected were Capt. Roy N. Francis, Capt. Clifford B. Harmon, Lieut.-Col. Harold E. Hartney, Major Frank H. Page, Lieut.-Commander H. W. Schofield, Major George R. Wadsworth, General Wood, Captain Rickenbacker and Mr. Driggs. Directors from what is called the civilian section were A. L. Haustetter, Lester P. Barlow, Gutzon Borglum, Frank G. Diffin, Charles M. Manly, Robert H. Sexton and Chance M. Vought. The club has taken a lease on two attractive houses in Thirty-eighth Street and offers accommodations for about fifty aviators.

The International Air Service Club was organized for the purpose of promoting efficiency in the Air Service, to foster *esprit de corps* by maintaining its best standards and traditions, to disseminate professional knowledge and provide means for social activities and entertainment for all members who are interested in aviation.

Setback for the Atlantic City Show

(Continued from page 1)

in charge of the Exposition that the companies comprising the Association did not care to participate in the Exhibition.

The Pan-American Convention Exposition plans to have meetings during the month covering all subjects of general interest regarding aeronautics. Whether or not the decision of the Manufacturers Aircraft Association not to participate will cause the promoters of the Exposition to postpone it to a more opportune time and a more favorable location remains to be seen.

ARTILLERY FIRE DIRECTED BY RADIOPHONE

New Field for Aviators Who Are Trained Artillerymen

COMMANDER 2000 FEET UP

Brigadier General Hand's Report of Two Days' Cooperation Between Airplane and Battery Recently

A Field Artillery Brigade in action, with its artillery commander 2000 ft. up in the air observing and giving firing commands direct, is the latest situation in aerial adjustment brought about by the use of the radio telephone.

Obviously, it cuts the time in field artillery response. Under the old system of airplane observation it took from an hour to an hour and a half to adjust the fire of one gun, the time being taken in giving commands to the battery. By using the radio-telephone and giving the firing commands direct—as can be done by the aviator if he is a trained artilleryman—the time for making all shifts and range changes can be more than quartered; and in this same less-than-one-fourth of the time, more than one gun can be brought into the action, and even the fire of a whole platoon.

These are actual results from recent experiments with the radio telephone between an airplane from Rockwell Field, San Diego, Cal., and a battery of field artillery training at Camp Kearny.

The airplanes used in these experiments have been the Curtiss JN4-H, equipped with SCR 68 sets. An SCR 59 set has been used on the ground with SCR 53 antenna unit. (Radiophone). The practice work is being carried on at regular intervals.

Brigadier General Hand, commanding the 16th Field Artilery Brigade, in giving his report of two days of cooperation between airplane and battery in the earlier days of this practice, has shown incidentally of what stuff aviators are made. Following is an extract from the General's report:

"Yesterday and today we have had firing by aerial adjustment from airplane using the telephone. The ground aerials were set up right at the battery, the executive officer wearing the telephone headdress. All the conduct of fire was by an aviator.

"The aviator who did the adjustment received the first lesson in adjusting fire by me 15 minutes before he went up, and that is all he knew about artillery fire. He was very bright, however, and on his first problem gave the proper commands for shifting his gun into its target and all the proper range changes throughout precision adjustment, including improvement fire. The first problem was 22 rounds and lasted 19 minutes from the time he left the ground until the last shot. I had him actually give the firing commands, and he sent us no sensings whatsoever. In other words, he was battery commander. The second problem he secured his adjusted range and fired six rounds in improvement fire, making a total of 16, in 14 minutes. Included in this 14 minutes he had given the commands to bring in the second gun. This morning he went up, adjusted two guns of a platoon separately, brought in the whole platoon in fire for effect, making his corrections properly, and total time from his leaving the ground to last shot—21 minutes; total rounds fired—47.

"We all were greatly pleased with the results, and to my mind it means a revolution in aerial adjustment. If the aviator is a trained artilleryman he can handle this fire with the ease, speed and facility which one could do under the very easiest of terrestrial observation conditions. There was none of the long, tiresome delay such as I have been used to under our old system, as, you know, it took us about an hour or hour and a half, if we were lucky, to adjust one gun by airplane. The ship flew at about 2000 feet. I don't see why it wouldn't be possible to even pick up a fleeting target and adjust shrapnel fire with all the guns. Of course the height of burst might give him trouble, but take it on the proper proportion of air and graze, the trained field artilleryman should be able to handle it, and possibly one could get a very good idea after practice by rating the relation of the pattern to the burst, and be able to tell something about the height.

"However, to sum up my whole observation so far, I believe from now on, where the phone can be used, and we have trained observers, they should give the firing commands direct instead of sending sensings down, and waiting for the ground people to transpose them to the battery. The ship we used had only one-way communication, but in a few days they expect to have apparatus so that we can also talk from the ground. That will make everything simple.

"I forgot to tell you that we purposely gave him a good error in deflection each time he was up, and he had no difficulty in making the proper shift. The accuracy of firing speaks for itself. In one problem he had three target hits during improvement and in another one two. . . ."

Charles H. Day, Consulting Engineer of the Standard

Charles H. Day was born Dec. 29, 1884, in Salamanca, N. Y. He attended public school and graduated from Hornell High School. He entered the Rensselaer Polytech Institute in 1902 and left in 1903, owing to ill-health. Became draughtsman and engineer with M. H. C. Brembacher, manufacturer of Climax gas engines and remained there until 1904. In the Spring of 1904 he went to California and then to Alaska. Returned to California and engaged in mining engineering in the Y. M. C. Auto School in Los Angeles. Left and opened an auto repair shop, the firm name being Brown & Day. Mr. Day had just attained his majority. He sold out his interest in this concern and went to Nevada, where he ran an auto stage line in connection with the railroad (and transport) in Rhyolite for a year and a half. He covered the entire State of Nevada and 15,000 miles on New Desert. The following year he was chief engineer for Fink Motor Car Co., Danville, N. Y.

Until 1900 Mr. Day was foreman of two auto-machine shops in Los Angeles, and in 1909 opened a motor cycle agency in Long Beach, Cal. In the Fall of 1909 he built an airplane complete, including the motor, doing his own machine work at night.

In 1910 he made various flights, usually working all week on the machine and wrecking it every Sunday. He ran out of funds, so he worked during the day, he says, to get enough to wreck the machine with on Sunday. Finally he had a bad fall at Dominquez Ranch, Cal., from a height of 100 feet, totally wrecking the machine. He left the machine where it fell and never saw it again.

Mr. Day then went to Santa Anna, Cal., and designed airplanes for Glenn L. Martin, but could not agree on his desire for a satisfactory tractor airplane. During the summer of 1912 he built a tractor airplane in Los Angeles. He went to Chicago to represent the Hall-Scott Motor Car Co. as a motor expert in that district. He took the tractor along. The tractor was known as the Baby Day Tractor and was purchased by DeLloyd Thompson and Max Lillie, of the Lillie Aviation School, Chicago, and was flown by Thompson in sensational exhibition flights in and about Chicago.

He then returned to Los Angeles and opened an airplane factory. Sold the plant to Glenn L. Martin and entered his employ as chief engineer and designer and remained in this position until the Spring of 1914, when he left and built a special looping machine for DeLloyd Thompson. He went on the road as Thompson's partner, making looping exhibits in various parts of the United States.

In the Fall of 1914 Mr. Day came East to design and build machines for the Aircraft Company, which became the Sloan Airplane Company in Astoria, L. I. This factory moved to Bound Brook, N. J., and then to Plainfield in the Winter of 1915. This company eventually became the Standard Aero Corporation. He became a member of the Board of Directors, and later was elected Vice-President and Consulting Engineer of the Standard Aircraft Corporation and Consulting Engineer of the Standard Aero Corporation.

Aeronautics in College Courses

The Division of Military Aeronautics, in cooperation with the Committee on Education and Special Training of the General Staff, has arranged a training program for college students which will not interfere with their prescribed college courses, but which will, at the end of three years, turn out men prepared for commercial or for military aviation.

In view of the depreciation among our Reserve officers of not less than 10 per cent a year, it is estimated that the Air Service must draw from some source about 1000 pilots, 650 airplane and balloon observers, and 100 engineer officers every year. West Point, essentially military schools, and the ranks can be drawn upon only to fill up the Regular establishment. Therefore the machinery of the Reserve Officers' Training Corps, as established by General Order No. 49, 1916 (W. D.), and now in process of modification, was chosen as most likely to bring about desired results.

In outline the plan is to give the equivalent of the work formerly done in the ground schools exclusive of military practice—that is, airplanes, engines, gunnery, navigation and maps, infantry and artillery cooperation, and signaling—at the colleges and universities during the college year and give flying and military training during the six weeks summer camps held at northern flying fields. It is estimated that three summer camps will be required to qualify for pilot.

Many Unclaimed Insurance Papers

The Bureau of War Risk Insurance announces that a large number of insurance certificates remain undelivered. This is due to insufficient or no address having been given in some cases, while in many others the address of the beneficiary has changed and the certificate has been returned.

All officers and enlisted men whose insurance certificates have not been received either by themselves or by their beneficiaries, should write to the Insurance Division, Bureau of War Risk Insurance, Treasury Department, Washington, D. C., stating the folowing:

a. Full name.

b. Rank and organization at the time of application for insurance.

c. Army serial number.

d. Present address.

e. Name and address of the beneficiary if it is desired that the certificate be sent to the beneficiary.

f. If it is not desired that the certificate be sent to the beneficiary instructions will be given as to what disposition is to be made of it.

Certificates will in no case be sent for file to the Adjutant General of the Army.

Additions to the Honor Roll of the Army Air Service

The following additional officers of the American flying arm have been decorated for conspicuous bravery in action. The list, which includes both American and foreign awards, has been compiled from available official sources, but the records are not complete:

DISTINGUISHED SERVICE CROSS

Gardner Philip Allen	1st Lieut. C. A. C.
Flynn L. A. Andrew	1st Lieut.
David H. Backus	1st Lieut.
Herbert B. Bartholf	1st Lieut.
Erwin R. Bleckley	2d Lieut.
Samuel C. Bowman	2d Lieut.
Hugh D. G. Broomfield	1st Lieut.
John R. Castleman	1st Lieut.
Weir H. Cook	1st Lieut.
Hamilton Coolidge (deceased)	Captain
Justin P. Follette	1st Lieut.
William F. Frank	1st Lieut.
Harold E. Goettler (deceased)	2d Lieut.
Andre Gundelach (deceased)	1st Lieut.
D. C. Hunter	1st Lieut.
John N. Jefers	1st Lieut.
Samuel Kaye, Jr.	1st Lieut.
Willburt E. Kinsley	2d Lieut.
James Knowles	1st Lieut.
G. DeFreest Larner	1st Lieut.
William O. Lowe	2d Lieut. U. S. M. C.
Edward Russell Moore	1st Lieut.
Edward M. Morris	2d Lieut.
Stephen H. Noyes	Captain
Alfred B. Patterson, Jr.	1st Lieut.
Britton Polley	1st Lieut.
Charles P. Porter	2d Lieut.
Clearton H. Reynolds	Captain
Leslie J. Rummell	1st Lieut.
Karl J. Schoen (deceased)	1st Lieut.
Richard B. Shelby	1st Lieut.
John Y. Stokes, Jr.	1st Lieut.
William H. Stovall	1st Lieut.
William H. Vail	1st Lieut.
Pennington H. Way (deceased)	2d Lieut.
Joseph F. Wehner	1st Lieut.
Chester E. Wright	1st Lieut.

LEGION OF HONOR—FRENCH
(Commander)

Charles T. Menoher	Maj. General
William Mitchell	Brig. General

CROIX DE GUERRE—FRENCH

Thomas J. Abernathy	2d Lieut.
James A. Healy	1st Lieut.
Arthur H. Jones	1st Lieut.
Charles T. Menoher	Maj. General
Ralph A. O'Neill	1st Lieut.
Charles P. Porter	2d Lieut.
Kenneth L. Porter	2d Lieut.
Joseph C. Raible, Jr.	1st Lieut.
Louis C. Simon, Jr.	1st Lieut.

FRENCH CITATIONS

Valentine J. Burger	2d Lieut.
Alexander T. Grier	2d Lieut.
Horace A. Lake	2d Lieut.

CROCE AL MERITO DI GUERRA —ITALIAN

James L. Bahl	1st Lieut.
Raymond P. Baldwin	1st Lieut.
Arthur M. Beach	1st Lieut.
Allen W. Bevin	1st Lieut.
Gilbert P. Bogart	1st Lieut.
Arthur F. Clement	1st Lieut.
William G. Cochran	1st Lieut.
De Witt Coleman, Jr.	1st Lieut.
Kenneth G. Collins	1st Lieut.
Alexander M. Craig	1st Lieut.
Herbert C. Dobbs, Jr.	1st Lieut.
Edmund A. Donnan	1st Lieut.
Norton Downs, Jr.	1st Lieut.
Arthur D. Farquhar	1st Lieut.
Harry S. Kinkenstaedt	1st Lieut.
Willis S. Fitch	1st Lieut.
Donald G. Frost	1st Lieut.
William O. Frost	1st Lieut.
James P. Hanley, Jr.	1st Lieut.
Spencer L. Hart	2d Lieut.
George C. Hering	1st Lieut.
Wallace Hoggson	1st Lieut.
Gosta A. Johnson	1st Lieut.
James Kennedy	2d Lieut.
Leroy D. Kiley	1st Lieut.
Herman F. Kreuger	1st Lieut.
Fiorello H. LaGuardia	Major
Paton MacGilvary	1st Lieut.
Oble Mitchell	1st Lieut.
William H. Potthoff	1st Lieut.
Aubrey G. Russel	1st Lieut.
William B. Shelton	1st Lieut.
Norman Sweetser	1st Lieut.
Norman Terry	2d Lieut.
Emory E. Watchorn	1st Lieut.
Frederick K. Weyerhaeuser	1st Lieut.
Warren Wheeler	1st Lieut.
Alfred S. R. Wilson	1st Lieut.
Warren S. Wilson	1st Lieut.

ITALIAN CITATIONS

James P. Hanley, Jr.	1st Lieut.
George C. Hering	1st Lieut.
William P. Shelton	1st Lieut.
Norman Sweetser	1st Lieut.
Emory E. Watchorn	1st Lieut.
Frederick K. Weyerhaeuser	1st Lieut.

SEEKING THE STORIES OF AVIATORS

On February 1, the Director of Military Aeronautics sent the following letter to the presidents of all universities and colleges in this country:

"The Director of Military Aeronautics askss your cooperation in the following matter, which is important to the Air Service of the country and which may be of yet more intimate concern to the locality and to the institution with which you are associated.

"This office is making every effort to assemble the personal stories of the men who have been with the Air Service overseas. It seems not unlikely that the better part of each story is contained in letters to friends and relatives at home. Letters from some of our aviators have already appeared in book form and in the magazines, and from time to time college publications have had occasion to print appreciations of fliers killed in combat.

"Such informal records may supply information of historical value to be had from no other source—information which should find a place in the written history of the country.

"The Director of Military Aeronautics therefore makes this request: that, with the full sanction of those most concerned, this office be furnished with copies of such letters, or excerpts from them, and likewise with copies of any of your student or alumni publications that have contained articles pertinent to this subject. It would be gratifying, also, if you would interest your townspeople in this matter, and would obtain the cooperation of the local press. Whatever you can do to further the assembling of this data,—and with reasonable haste,—that nothing may be lost,—will be deeply appreciated here.

"Communications in reply should be addressed:

"Director of Military Aeronautics, 6th Street and Missouri Avenue, Washington, D. C.

"Aeronautical Information Branch."

War Department Emblems of Discharge

The "honorable discharge" emblem to be issued by the War Department will be a bronze lapel button somewhat similar to the G. A. R. button of like significance. It is the intention of the Government to distribute the button free of charge to all entitled to it. The buttons will be manufactured only by concerns chosen by the Government, which will furnish the dies for their manufacture and purchase the buttons, thus obviating any possible variance from the approved pattern in design, color or material.

Of appropriate and artistic design, the button is the result of a competition among American artists and sculptors, conducted by the Commission of Fine Arts, of which Charles Moore is chairman, and the following are members: Herbert Adams, J. Alden Weir, Charles A. Platt, William Mitchell Kendall, John Russell Pope, James L. Greenleaf, and Col. C. S. Ridley, secretary. Fifteen designs were submitted by the Commission for final selection by the Chief of Staff.

Souther Field-Atlanta Flight

The classification of enlisted men to the number of 128 to be discharged reducing the number to 65 has been nearly completed, and the discharges will be arranged within the next few days to be completed not later than March 31.

Notwithstanding the reduction of the force of enlisted men to 65, the interest in aviation is not relaxing amongst the civilian population of Georgia. Twelve of the leading newspapers of the state give considerable space daily to Souther Field news.

Philip P. Vitsky, Manager of the Telegraph Department at Souther Field, has been promoted to the rank of Corporal.

Major John W. Butts, Executive Officer, has asked all the enlisted men who have not had a ride in an airplane to send in their names to headquarters. Some of the boys are delighted with the possibility of a flight, before leaving the service.

The stability of the atmosphere was well demonstrated here on Tuesday, the barometer remaining stationary the entire day at 29:80. This morning it reached 30:02 and continued to advance to 30:10 at the highest for the day and highest for the winter. It is not generally known, but one inch on the barometer represents a change in the density of the air equivalent to a 1000 feet of elevation. That is if the barometer at the surface drops from 30 to 29, the air at the surface is the same as that prevailing 1000 feet higher when the barometer was at 30. In other words at the earth today barometer is at 30 and if tomorrow it is 29 you have ascended 1000 feet as far as quality of the air is concerned.

Weather conditions were favorable on March 13 for the Souther Field-Atlanta flight (113 miles). The first ship took off at 9:17 A. M., others following two minutes apart. At 2000 feet the usual flight formation was perfected. The order was as follows: Ship No. 37—Lieut. Col. F. T. Dickman, Lieut. Alfred W. Vance; Ship No. 44—Lieut. Wilfrid B. Warde, Lieut. Earl A. Burgtoff; Ship No. 39—Lieut. Walter F. Sutter, Lieut. Alex B. MacMullen; Ship No. 46—Lieut. Perry W. Blackler, Lieut. John R. Irwin; Ship No. 27—Lieut. Myron F. Lackey, Lieut. Milton A. Price; Ship No. 42—Lieut. David M. Suttle, Lieut. Herbert G. Blackeslee, and Ship No. 40—Lieut. Samuel C. Stout, Lieut. Iltred W. Craig.

Major Moulthrop of the Operations Division, General Staff, will soon visit Souther in connection with future plans of the Air Service.

Costs of the Air Mail Service

The consolidated statement of operation and maintenance of the Post Office Air Mail Service for the period from May 15, 1918, to Jan. 1, 1919, gives much useful information as to the cost of flying.

It covers the work of seventeen machines which flew a total of 1,379 hrs., and 17 min., on 101,090 miles. The engines consumed one gallon of gas for each 4.66 miles run. The itemized costs were as follows:

	Total	Average Per Mile
Gas	$6,587.63	$ .0651
Grease and oil	1,467.90	.0145
Office force	2,254.82	.0223
Motorcycles, trucks	4,411.23	.0436
Rent, light, power, telephone, water	2,660.75	.0263
Miscellaneous	5,090.20	.0503
Pilots	9,667.87	.0956
Mechanics and helpers	14,515.57	.1435
Repairs and accessories	14,006.86	.1383
Interest	7,070.29	.0699
Dep'm'tal overhead charge	6,705.94	.0663
Total	$74,581.82	$ .7377

This figures at the rate of $54.05 per mile. The planes used were Standard J.R.-1 with 150 H.P. Hispano-Suiza engines, Curtiss J.H.-4-H. with 150 H.P. Hispano-Suiza engines and Curtiss R-4-L. M. with 400 H.P. Liberty engines.

Chanute Field

Lt. Leonard, Adjutant, Lt. Karr, Assistant Engineer Officer, and Lt. Gibson. Commanding Officer of the A. S. F. S. Detachment, have completed all necessary flying training, and are now awaiting official permission to wear wings.

Major Moultrop, of the General Staff, recently visited Chanute Field, investigating the possibility of retaining the field as a permanent flying field. Chanute is regarded favorably in this respect due to excellent geographical location, the natural terrain surrounding the field, and the marked absence of air pockets.

Lt. Alfred D. Karr recently flew to an altitude of 12,600 feet in the ordinary JN4-D Curtiss training ship, which is above the average ceiling for this type of ship. The altimeter showed 15,000 feet, but when corrected showed 12,600.

All officers of the Air Service having applied for service in the Regular Army are now attending a Garrison School and are taking a special course in Airplane Engines.

Captain Howard E. Ousler is the new Quartermaster at this field, having reported from Camp Zachary Taylor, Kentucky, to relieve Capt. Leon F. Langtre.

Rodman Law, former aviator, motorcycle rider, steeplejack, and generally known universally as a dare devil, is now stationed at this field as a flying cadet. Cadet Law recently demonstrated his ability by climbing the flag pole at this field to straighten out the flag.

Permanent Exhibit of Aircraft

It was announced at the Aeronautical Exposition that a number of the exhibits now on display there will be sent to Washington after the close of the show to become the nucleus of a permanent exposition at the United States National Museum.

Under direction of Dr. Charles D. Walcott, secretary of the Smithsonian Institution, plans for a permanent War Exposition in Washington have been under way for some time and are now definitely arranged.

Dr. Walcott, a member of the National Advisory Committee for Aeronautics, is particularly interested in aviation and has been since the days of Langley, who was himself at one time secretary of the Smithsonian. Consequently a large part of the War Exhibition will be the development of the science of aeronautics and include many American and European examples of airplanes and accessories.

Exciting Ride in a Free Balloon

Not long ago an observation balloon at Brooks Field broke from its cable, and Second Lieuts. R. W. Mackie, J. S. Eldridge and Herbert W. Reid, though taken on an unceremonious air voyage, had an experience exactly in accordance with their wishes. The balloon had reached an altitude of 100 ft., and was descending when the wind slowed down, but when within a few feet of the ground, went into a bad nose dive. It was then that the cable snapped and the balloon was free. Lieutenant Reid and Eldridge made reports of their experiences. The former, who was acting as pilot, said in part:

Went Up 7950 Feet

"The balloon ascended very rapidly and I began to valve at once. At 3000 ft. the manometer pressure had reached about 25 mm. At exactly 7950 ft. the balloon ceased to rise. I then ceased valving.

"In a short time the balloon began to drop. We dropped very rapidly and at 500 ft. I began to throw out sand, my flying coat and such other material as was not tangled up as a result of the nose dive. We landed about 12 km. from the point of ascension, in a slump of mesquit; the occupants of the basket were bounced out on the ground as the result of the rather hand landing. I did not wish to tie the rip cord around my waist as some rip panels have been known to require three men to rip them. After the occupants were thrown out the balloon rose rapidly.

"The weight of Lieutenant Eldridge's body ripped his parachute off the basket as the latter rose. The ropes and bar on Lieutenant Mackie's parachute were tangled and twisted and because of this he was carried off the ground by the rising balloon. Lieutenant Mackie then climbed hand-over-hand up to the parachute case and managed to untangle the ropes there. This was accomplished at 200 ft. off the ground. Instantly the parachute dropped. Lieutenant Mackie made a perfect landing. Lieutenant Eldridge suffered slight strain in the back as the result of landing; Lieutenant Mackie suffered slight ankle strain only, for the same reason; I was not at all injured.

"I would recommend that balloon observers be given more than class room work in the handling of a free balloon."

Had Just $13

From the account of Lieutenant Eldridge, who is a R. M. A., the following excerpt, beginning from the time the balloon began to rise after breaking away, is taken:

"As we went up Lieutenant Reid was busy freeing the basket from all cordage and rigging. We had two sand bags, our leather coats and seats and the instruments to throw over in case of emergency. While going up we first checked up our finances and found we had $13 between the three of us.

"Our first plan was to let the balloon go as long as we could stand it, but we were all hungry as it was nearly dinner time. We thought we might get out of Texas if we struck a favorable air current. Our second plan was to let the gas out through the valve and try to land the balloon as Lieutenant Reid had no parachute. We were now about 3000 ft. up and ascending very fast. So having decided on the latter course Lieutenant Reid commenced valving the balloon.

"At 7000 ft. we struck wind blowing from the West which seemed to be quite strong. We drifted to the East of Brooks Field. We were not sure whether the valve was working or not but finally could make out that the gas was escaping. We passed on up to 7800 ft. and then entered into a region of calm. I was worried for fear the gas would expand more rapidly than we could let it out through the valve, but my fears were groundless. At 8000 ft. altitude our ascension was checked. We remained at this height for the period of five or six minutes. Then we began to descend slowly, coming back into the wind from the West. We were somewhat worried then as to whether the suspension of the basket would hold because we were held by ropes which rose to the nose of balloon, the gas being out of the rear portion, and our balloonette, useless.

The Nearer the Faster

"We descended to an altitude of 4500 ft., when an airplane from Brooks Field reached us and circled around us during our descent. We began to drift to the East, descending at the same time. We got the ballast ready to throw overboard. Lieutenant Mackie and I put ourselves under the orders of Lieutenant Reid. In coming down we seemed to descend in about the same speed as an airplane comes in a steep glide. At this time we were over some mesquite about six miles from Brooks Field. The nearer we got to ground the faster we came down.

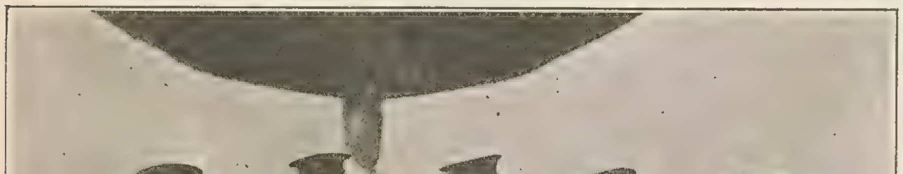
"At Lieutenant Reid's orders, I got on the edge of the basket, knees bent, prepared to jump. Lieutenant Reed was busy throwing over ballast. I felt the basket hit the mesquite so I dropped, intending to land on hands and feet. The baket recoiled from the mesquite. The parachute, being still attached to my waist, (I did not have time to unsnap it when we were close to the ground and did not care to do so while we were above 500 ft.) gave me a jerk, lifted me higher in the aid turned me over so that I fell on my back from about the height of the mesquite trees. I was stunned so that I could not get up from the fall. From the position in which I lay I saw the basket hit the ground, and turn over once. There was a 'flurry' of arms and legs—and Lieutenant Reid came rolling out. The balloon skidded along the mesquite for a few seconds and then bounded into the air, carrying with it Lieutenant Mackie, whose parachute was caught. I heard Lieutenant Reid say, 'My God, he's gone up with it again,' referring to Lieutenant Mackie. Here I became numb for a few minutes.

"Lieutenant Reid came over and asked me how I was. I replied that I was all right except for a sore back, for I was numb from my waist down. He told me to brace up, and then ran over in the direction of the balloon. In a few moments he returned, looking wonderfully relieved, Lieutenant Mackie having made a successful parachute leap from an altitude of 200 ft. Mackie was somewhat shaken up, but otherwise all right.

"The first of the pilots from Brooks Field, who had landed their ships in a nearby field came up. A medical officer came with the hospital ship, looked me over and found that I had only a wrenched back. So we cleaned up our clothes and came back to Brooks Fields in one of the Government Fords.

"The balloon, freed of its cargo, ascended to an enormous height, drifted to the Southwest, and was found some hours later about twenty-five miles from its point of ascension."

Col. J. Prentice, A. S. A., and Major Bonvallain, French Balloon Service



Five Officers Active in the Balloon Service

From Left to Right: Capt. Leroy E. Gahris, Aerial Photographic Observer, D. M. A.; Major Ruben H. Fleet, R. M. A., D. M. A.; Lieutenant Simpson, Pilot, D. M. A.; Captain Smythe, Balloon Branch, D. M. A. and Lieut. Proctor, Observation Branch, D. M. A.

Forty Hours in a Navy Dirigible

When Ensign T. E. Maythem of the Navy Air Service established what is thought to be a new world's record for time spent in continuous flight, he used a Navy dirigible driven by a Curtiss OXX motor. The record which has been allowed officially, is 40 hours 48 minutes in the air.

The flight was made on Dec. 24-26 and Ensign Maythem was accompanied by Chief Carpenter Mate J. H. Collier. The course covered, 691 miles, exclusive of thirteen hours of exhibition flying at Key West, Tampa, Cape Sable and Palm Beach.

In a letter to the Curtiss Officials, Ensign Maythem says:

"It may be of interest to you to know that in the thirty-two-hour endurance flight made in a Navy dirigible on Nov. 23-25, the Curtiss OXX motor was used. Previous to this flight, the motor had 90 hours in the air without overhauling. During the flight, the motor was not stopped at any time, oil being supplied from a three-gallon auxiliary tank and additional water being found unnecessary.

"On Dec. 24-26, another flight of 40 hours, 48 minutes was made. In a straight course, a distance of 691 miles was covered, excluding thirteen additional hours of exhibition flying. The motor was stopped twice, three minutes each time, to put in additional oil."

The dirigible carried full equipment, totalling 832 pounds. This included extra oil, gasoline, clothing, sea-anchor, life-belts, camera, radio apparatus, light and batteries.

Major Boots' Flight Described in Detail

From Mt. Clemens, Mich., to New York City is approximately 500 miles. Below is the log of Major Norman J. Boots, Army pilot, who recently made the distance in a non-stop flight of four and one-half hours. He used a De Haviland 4 with a Liberty engine. His log reads:

"Left Selfridge Field nineteen minutes to 12 on Thursday, Nov. 7, 1918, for New York City. I had a Fisher Body de Haviland 4, No. 22,820, equipped with Liberty motor and one extra twenty-five gallon gasoline tank which was installed at my direction at this field. I figured my gas supply would be sufficient to keep me five hours in the air. A steady west wind was blowing when I left.

"I took off across Lake St. Clair, due east until I struck Lake Erie, following the shore line to Buffalo, which I reached in an hour and forty-eight minutes. I determined that if I could make Buffalo in less than two hours, I could make New York City without landing. Between Selfridge Field and Buffalo I maintained an altitude of 2000 ft. The landing fields along this route were very poor; most of the land was marshy or wooded and all the open fields were rather small for landing a de Haviland. In Buffalo I flew southeast and followed a direct compass course from here to New York City, passed over the aviation field at the Curtiss factory at Buffalo and many ideal landing places for thirty miles southeast of Buffalo. My route took me south of the lakes east of Buffalo and just north of Elmira, at which point I started crossing the mountains.

"Between Buffalo and New York I maintained an altitude of 8000 ft. A steady wind was blowing from the west. For a period of one hour before reaching the Hudson River the country passed over was very rough, although the mountains were not particularly high at this point, but were wooded. However, it would have been possible in several places in this area to have landed on the sides of the valleys made by rivers which were numerous in this part of the state. I passed over the Susquehanna and Delaware Rivers in the northeast of Pennsylvania.

"I saw the outskirts of New York City about 4 o'clock. Crossed the Hudson River at Yonkers and ran into a fog which came up very suddenly, completely covering the land around the mouth of the Hudson. Came down to an altitude of about 100 feet, saw the Empire Race Track, which, I believe, is eight miles from the center of New York, tried to make a landing there, but on closer view noted that it was piled with stones and crossed with ditches. As I started up, my motor began sputtering. I figured that this might be due to exhausted gasoline supply. I landed my machine on the best available field, which was on the side of a hill near St. Joseph's Seminary, on Seminary Avenue, Dunwoody Hill, southeast of Yonkers. In making this landing it was necessary to brush my wheels and landing gear on the top of some trees on the lower end of the field in order not to overrun it.

"The landing was effected at 4:12 p. m., same date, without accident of any kind. The day was clear on the entire trip except on approaching New York City, where a fog was encountered. I used only the gasoline supply with which the Fisher Body plane is equipped. The tank, which was installed at this field, was not touched. Believe that had I started from Chicago with this supply of gas and this particular machine, I could just about make the trip from Chicago to New York."

In attempting to take the air from this small field the following afternoon, Major Boots dragged through some trees and had to make a forced landing with consequential damages to the plane.

This flight proves to Army officers that the New York-Chicago flight can easily be made in a day with a powerful plane of this type. It also conclusively demonstrates to them the great value of chains of landing fields across the continent under air routes for emergency landings.

Want Aircraft Makers Interested

A movement is under way for the establishment at Washington, D. C., of a permanent exhibit of the resources of the states. In March, 1917, there was organized for this purpose the American State Exposition Association under the leadership of Robert N. Harper, a Washington manufacturer, who is now active in reviewing the project, which had to be discontinued on account of the war.

The plan is of some magnitude and includes the erection and maintenance by each state of its own exposition building for the display of its industries and products. Should it materialize, it goes without saying that it would be incomplete unless manufacturers of aircraft, engines and accessories could be interested in making exhibits of the development of the aeronautical industry, which the war brought to such size and importance as to command the respect and attention of the whole world.

Young Officers Who Helped to Organize the Balloon Schools

From left to right—Lieutenant Merrill, Lieutenant McCullough, Captain Schmidt, Captain Grimm, Captain Schiller and Lieutenant Simpson.

Harris & Ewing

Col. A. L. Fuller, Member of the Advisory Board to the Director of Air Service Under the Reorganization

Current Opinions

New York Tribune: Anticipating the extension of the aero mail system and the beginning of aero passenger service, several wide-awake chambers of commerce are planning municipal aerodromes. Newark is raising a fund of $25,000 to construct a landing place for the aeroplane mail. The regular New York-Washington aero mail service now has its terminal at Belmont Park, Long Island, a half hour's ride by train from this city. The mail must travel via the Pennsylvania Railroad from the city to Belmont Park and then be transferred by truck to the aeroplanes. Newark's idea is to capture this terminal and make itself the relay point for aero mail between New York and Washington. But why should aeroplanes carrying mail to or from New York City land either in Belmont Park or Newark? Why shouldn't they land near the heart of the city? The space can be found.

Alreay aeroplanes are flying regularly and on schedule time from Belmont Park through rain, shine, snow or fog, negotiating the distance to Philadelphia in less than an hour and to Washington in an average of two hours! In 350 consecutive flights, in all kinds of weather, only three 'planes were delayed, and not one failed to carry the mail through to its destination. This is a record for stability of service that cannot be surpassed by steamboat or train. Next spring, when the aero mail service to Chicago and other points West is inaugurated, it will be all the more necessary that aircraft shall have a nearer landing place. A city like Spakane, with a population of only 150,000, has already established a municipal landing field, properly equipped with hangars, shops. etc. The Spokane Chamber of Commerce has also applied to Assistant Postmaster General Praeger to inaugurate aero mail service between that city and Pacific Coast towns. Seattle is 300 miles away from Spokane as an aeroplane flies and it requires twelve hours for the quickest mail train to traverse the distance. Any mail aeroplane can do it in less than three. Spokane is awake to the possibilities of the aero mail. New York is not.

Peter Clark Macfarlane, war correspondent: Only a small percentage of our men went over the top more than once. Very few went over more than two or three times. But the aviators, said Mr. Macfarlane, went over the top every day, and his admiration for their courage was unbounded. But there was still another sort of courage born of aviation—the courage required in the field when the Germans had the air. This, it must be remembered, was a good part of the time up to the last few weeks. Then it was necessary for all hands to continue their work while the unchecked German avons rained shells upon them from the clouds. This was probably the hardest ordeal of the war. It was with a good deal of satisfaction that Mr. Macfarlane noted some signs of ruin wrought in Treves, when the American Army entered, and it was explained to him that this was the work of American flying men. "Mein Gott!" said one of the inhabitants, "How we did dread to see a fine day!"

Capt. Edward V. Rickenbacker: The development of the airplane must become part of our preparedness programme. I believe in preparedness. The League of Nations is a very fine thing, but I believe that as long as you have nations you will have war, and it is our duty to be ready.

TECHNICAL AERONAUTICS

German Fokkers Turned Over to the Allies After the Armistice Was Signed

Fixed Radial Cylinder Engine

(Paper by John W. Smith, S. A. E.)

Much interest is current at present in the Fixed Radial Cylinder Engine, which shows a great deal of promise. In his paper before the S. A. E. Mr. Smith describes a fixed radial engine of 200 h. p. 10 cylinders, air cooled with a bore of 4 17/32 inches and a stroke of 6¼ inches, which weighs only 1.8 lbs. per horse-power. When for a water-cooled engine, the weight of radiator and water is included, its weight per horse-power is certainly in excess of this figure. The fuel and oil consumption for this engine, according to official British reports was 0.52 lbs per horse-power hour, which is well below average practice for aero engines. When it is also considered that the air-cooled engines is simpler to install, and has less complications in the way of pipes, water pumps, etc., it certainly has promise. The difficulty in using these engines is the fact that they present a greater cross-section than the ordinary V-type engine of the same power, with a correspondingly greater fuselage area. If the engine is not streamlined into the fuselage, it still offers a great deal of resistance. Mr. Smith contends, however, that if the radial engine is internally cooled, by admitting cool air to the crank case from where it is forced up against the pistons, and also by designing exhaust valves so that the cool charge passes by them, it is possible to enclose the fixed engine entirely within the fuselage so that a good streamline job is obtained. There still remains the problem of regulating the cooling.

Seaplane Production

(Problems of the Naval Aircraft Factory During the War by Commander F. G. Coburn, S. A. E., Feb. 7.)

In this interesting paper Commander Coburn gives an interesting description of the work done at the factory and an impression of the enormous work it did. The following figures were compiled on Sept. 30th, 1918, a month and a half before the Armistice:

Total Floor Space, sq. ft....	750,000
Total ground covered including lumber yards, in acres	45,441
Total number of employes..	3,600
of which were women....	750
Value of Plant, Building and Equipment	$4,476,000
Supplies in Store..........	$1,621,000
Work in Process...........	$1,662,000
Total Inventory.........	$7,759,000
Value of Output	
(a) 183 twin-engined flying boats (at approximately $20,000 each)...	$3,660,000
(b) 4 experimental machines, 50 sets twin-engined flying boat spares and a considerable volume of ordinary experimental and repair work.	$2,000,000
Total value of output..	$3,860,000
Payroll for month of Sept., 1918	$405,000
Total expended in wages up to Oct. 1, 1918......	$2,790,000

while the original plant consisted mainly of a building 400 ft. square.

In dealing with problems of enlargement, rather than enlarge the factory beyond all measure, it was decided to utilize idle plants in the industrial world, and to erect as an enlargement of the Naval Aircraft Factory an assembling plant to be fed by these sources of parts and minor supplies. As sources for hulls some six yacht building yards were obtained, and for the supply of wings, metal parts, tanks, engine foundation assemblies, the services of a number of plants were enlisted which might otherwise have stood idle, due to the discontinuance of their peacetime business.

When the factory was starting it was necessary to employ men almost entirely for mechanical work. As soon as a sufficient number of men had been trained to carry the work along it was considered not only desirable but necessary to use women wherever possible. In fact, the most important training work the employment department had to do was the introduction of women into the factory.

A training school was established for women. Upon Employment women were placed in this school and there, under close supervision of mechanical instructors, performed the same kind of work which they would later be called on to perform in the factory. One of the most serious production difficulties which the factory experienced was in the presence of defective wood—wood with pitch pockets and spiral grain, both of which are difficult to detect. These difficulties were overcome by the use of built-up spars and struts. In built-up spars and struts it is possible to use smaller pieces of wood, so that rejections are smaller, and also by having two or more laminations or parts in the same piece, the danger of complete failure is lessened, since one part may be defective yet the other may be good, and the combination provide a sufficiency of strength.

The Development of British Airships

Before the Great War Germany held a pre-eminent position in airships, both with regard to numbers and performances. The manifold services this lighter-than-air fleet has rendered the enemy, particularly in connection with naval operations, can hardly be overrated, this entirely regardless of the fact that Zeppelins have time and again been brought down in flames during raids on the British Isles.

This particular phase of airship operations, being highly spectacular, has naturally attracted much more public attention than the unceasing scouting and convoy work Allied—and particularly British—airships have carried out to overcome the submarine menace.

When the war broke out the British Navy had in commission only half a dozen non-rigid airships of small size, but the work some of these vessels accomplished in patroling the Channel while the British Expeditionary Force was rushed to France so well displayed the value of airships for naval operations that in March, 1915, Great Britain laid down a comprehensive airship program.

At first, small non-rigid airships, called S. S. type (submarine scouting), were built. These ships, nicknamed Blimps, had a volume of about 60,000 cu. ft., and instead of a regular airship car, a BE 2c airplane body, complete with its 70 hp. engine and tractor screw, but without the wings, slung to the envelope. The S. S. had a high speed of 45 m. p. h. and a full speed endurance of about eight hours, and proved a valuable auxiliary for keeping the coast clear of submarines.

An improved and slightly larger type, the S. S. Z., was produced in 1916; this was remarkable for the better streamline hull, and a pusher airscrew. The car held a crew of three, and the record flight of one of these ships was about 51 hours. In 1917 this type was further refined, and fitted with two engines; the volume had by then risen to 100,000 cu. ft., the total horsepower to 150, and the full speed to 57½ m. p. h. This so-called S. S. T. (twin) has virtually supplanted the other S. S. types.

The same year Great Britain produced two more distinct types of airships, namely the Coastal and the North Sea. The Coastals did most of the long-distance patrols during the last two years of the war, and were principally employed in conveying ships from beyond the Scilly Islands up the Channel, while the N. S. type was designed as a fleet scout, for actions in the North Sea.

The Coastals have a capacity of 200,000 cu. ft., a car holding five, and two engines, mounted fore and aft in the car and driving a tractor and a pusher airscrew, respectively. An improved model of this class, the Coastal Star, appeared in 1918. These vessels have a 110 hp. Berliet engine forward, and a 260 hp. Fiat engine aft their full speed is 58 m. p. h., and their endurance, at full speed, 10 hours.

The North Sea type is much larger, displacing 360,000 cu. ft., and has two Rolls-Royce or Fiat engines, which develop a total horsepower of 520-550, and drive the ship at a full speed of 58 m. p. h. The endurance is 20 hours, and the crew consists of ten men. One N.S. type airship has made since the signing of the armistice a continuous flight of 61 hr. 21 min., which is a record.

Great Britain has also undertaken the construction of rigid airships of the Zeppelin type, four such vessels having been in commission on Jan. 1, 1918. Since then various units have been added to Great Britain's rigid airship fleet, one of the most recent of which, the R38, has a capacity of 2,720,000 cu. ft. and an estimated cruising endurance, at a speed of 45 m. p. h., of 211 hours.

That Great Britain fully realizes the great commercial possibilities of the airship is indicated by the recent report, to the effect that the British Admiralty is preparing to make available for commercial purposes several of its S. S. Z. and Coastal Star airships and nine landing stations.

The Airplane and the Automobile Engine

At a recent meeting of the S. A. E., a number of papers were read, discussing the possible effect of aircraft engine development on automobile practice. On the whole, the consensus of opinion seems to be that there are no great changes in automobile engine design as a result of airplane experience during this war. Contrasting the two types, H. C. Marmon gave the following résumê of the situation:

The airplane engine must have

(1) Reliability.
(2) Small weight per horsepower.
(3) Economy in fuel and oil consumption.
(4) Carburetion that permits easy starting and maximum power through a range of 30 per cent of the speed range, and idling at one-quarter maximum speed without danger of stalling. In short, no great degree of flexibility is required.
(5) Ability to deliver full power through a small speed range without excessive vibration.
(6) Complete local cylinder cooling under conditions of high mean effective pressure.
(7) Compactness.

In general, it can be assumed that the airplane engine will receive expert attention daily; it will be operated on a homogeneous highly volatile fuel and be lubricated with good oils. Relatively little regard need be given to the expense involved in fabricating any part of the engine or in the original tooling up. Further, a comparatively small part of its life will be spent at sea level and none in a dust-laden atmosphere.

The automobile engine must have:

(1) Reliability.
(2) Silence.
(3) Carburetion that accomplishes proper and even firing in all cylinders under varying throttle conditions, through speeds covering more than 90 per cent of the speed range of the engine. In short, great flexibility. Economy is secondary to this requirement.
(4) Ability to deliver partial or full torque through its entire range of speed without vibration.
(5) Compactness.
(6) Small weight per horse-power.

In general, it can be assumed that the automobile engine will receive attention at infrequent intervals and then usually at the hands of an inexpert person. It will be operated on fuels of low volatility and lacking in uniformity, and varying grades of lubricating oils will be used. The cost of fabricating the parts and tooling up must be kept in mind. Further, the engine must be designed to operate at higher speeds than is customary in airplane engines. Its entire operation is likely to be near sea level and often in a dust-laden atmosphere.

Reliability has been given as a prime requisite for both types of engine. It should be remembered that an automobile which has traveled 10,000 miles has had its engine running from 300 to 500 hr. This is considerably in excess of the normal life of an airplane engine in warfare. A typical two-seated airplane loaded with all its paraphernalia for reconnaissance work and the incidental fighting would, as it left the ground, have 20 per cent of its weight represented by bare engine and 15 per cent by fuel for a 3 or 4 hr. flight. These figures represent the extreme that has been attained in lowering the power-weight ratio and in fuel economy. A typical automobile carrying five passengers and fuel for an 8 or 10 hr. run would have, not including flywheel, clutch and starter, less than 10 per cent of its in engine and 3 per cent in fuel."

In the design of cylinders, the airplane engine steel cylinder will be prohibitive in cost. The overhead valve operation of the airplane engine is too noisy for a passenger car. On the whole it seems as if motor cars will be improved as a result of airplane experience, but this improvement will be apparent in the service the car gives, rather than in any radical change in design. This will come about as a result of better manufacturing faciilities, higher shop standards, and more intelligent inspection.

TURNING NOW TO PEACE USE OF AIRPLANES

Parts of Grover C. Loening's Paper Before the S. A. E.

200 M. P. H. IS POSSIBLE NOW

Attitude of the Public Toward Aviation Is Likely to Undergo a Very Radical Change

Following will be found parts of the paper read by Grover C. Loening before the Society of Automotive Engineers at its recent meeting, "Making the Airplane a Utility":

The pages of glorious history of the military airplane have practically been written, containing as they do not only the reports of the countless wonderful exploits of heroism and super sangfroid of the airmen, but also more prosaic accounts of quantities of airplanes and engines delivered, of millions of hours of flying, and here and there of instances of cleverness and ingenuity in engineering that gave the airmen high-performance steeds of incalculable advantage.

We turn over a new leaf now to the peace airplane, and are all seeking on blank pages the answer to what it will be, because the commercial peace-time airplane has not yet been under serious and continued development. It is a fact, quite generally apparent, that the most brilliant minds in aviation, both here and in Europe, for over ten years have been giving to their developments in airplane engineering a wholly military consideration, and whether unconsciously or not, have educated themselves and their industry so definitely along these lines that the dawn of a new era requiring special development of its own is practically at hand.

No Retrogression to Pre-War Status

Aeronautics will not revert to the status it had prior to the great war. No change in governments is apt to be more radical than the revolution in the attitude of the public and of business interests toward air travel that can be brought about by intelligent effort.

A great knowledge has been acquired on the scientific and practical aspects of airplane design and construction—an available mass of data forced into being by the pressure of war—and by virtue of the necessity of cooperation and of general dissemination for war purposes this technical data is more generally available, and better, more elaborately recorded by Government departments than could possibly have been done by scattered individual efforts. In this the war has been an asset. Not only is there technical data; much has been learned and recorded on the cost of upkeep of airplanes, the hours of flying a machine may be expected to give and the percentage of good flying weather in various localities. More than that, thousands of men have flown, have realized the limitations of flying, and have passed out of the stage of glamor and misguided "enthusiasm" to a more hand-headed and far more valuable understanding of aviation as it is—not as they would have dreamed it ought to be. . . .

Has not the tremendous development of the automobile been due rather to its utility than to the mere pleasure derived from riding about in it? When the automobile became a time saver and an exclusive conveyance, absolutely under the command of its owner, with no schedule but his will, its utility and convenience far outweighed mere pleasure driving, as is evidenced, for example, by the increasing popularity of the closed cars, where the open-air pleasure element is entirely subordinated to the convenience of the vehicle for transportation alone.

Airplane and Automobile Not Competitors

The airplane cannot hope, for the present, to cope with the automobile for short haul, with the motor car's ability to make of every curbstone a landing field; but the automobile as a conveyance ceases to show its great advantages over distances greater than 50 to 60 miles. It is here that the airplane can step in and begin to offer a feature of real utility—a conveyance, exclusive and capable of a longer distance radius. But as soon as it does so it obviously competes with the railroad train and the boat.

The automobile has already very seriously cut into the suburban trolley business, as evidenced by numerous reports on the subject recently issued. How can aircraft as a means of transportation seriously cut into railroad traffic, despite its higher expense? It can obviously offer higher speed in miles per hour, but how much higher must this be to overcome ordinary winds, and to offer less actual time in travel, not in miles per hour.

Speed is needed at the very outset to give to aircraft travel that element of real sound utility, offering so much of advantage that people will ride in airplanes, not because of the sensation, or the stunt of flying, but because, despite the danger, the uncertainty or the expense of flying, it is overwhelmingly the fastest and most direct way. When we get to this point a commercial era as big as railroading begins to rise out of the fog.

The significance of higher speed is readily shown. A 70 mile per hour airplane, with no allowance for head winds, would take about three and one-half hours to go from Belmont Park to Anacostia Field, near Washington. From the office door in New York to Belmont Park would take about 50 minutes, and from Anacostia to the Washington "office door" about 30 minutes, making a total of four hours and fifty minutes under perfect conditions and connections, a total certainly not enough less thán the train time to give any justification for the added expense and bother. But the 170 mile per hour airplane would go from Belmont Park to Anacostia in one and one-quarter hours, a shorter and therefore a less wearing trip, and with the same connecting trips to offices would give a total of two hours and thirty-five minutes from office door to office door—less than half the train time. A business man could leave his house at 8 a. m., arrive in Washington at 10.35, leave Washington at 2 p. m., and arrive at his office at 4.35. Now, as will happen, let us consider a 20-mile head wind. The 70 mile per hour machine will take about four and one-half hours for its flight, making a total of almost six hours—longer than the train; while the 170 mile per hour airplane will make its flight at 150 miles per hour in one hour and twenty-eight minutes, giving a total of two hours and forty-eight minutes. Obviously, therefore, the fast machine is less dependent on the weather. In addition, it is less wearing on the engine, due to the shorter duration of its run.

Patients at Cooperstown on a "Hike"

The element of safety, compared to the train, is questionable, and yet to be proved. There are many train accidents. The unreliability due to weather is governed principally by fog, since an airplane is not stopped by rain, particularly with a closed body. Enough must be offered to overcome objections.

Practicability of High Speeds

How practical is higher speed on airplanes? A three-seated monoplane recently, in test at Dayton, made 150 miles per hour. A European scout is reported to have made 160 miles per hour. The standard DeHaviland makes about 120 miles per hour. . . .

One thing is becoming very obvious: With the airplane designing knowledge available, the really fundamental and governing limitation is found in the engine available. The advent of a new engine is quickly followed, now, by suitable planes to make use of it, and the shorter time for development required for the plane is evidence of how much the advance in aviation is becoming essentially a problem of engines, the plane end requiring merely a clever and simple application of what we already know. In this it is becoming increasingly evident that the aeronautical engineer is far ahead of the engines he has available; so much so that a trend of endeavor on the part of aeronautical engineers to include in their work the designing of the engine they need is almost certain to come about.

The problem of increasing speed divides itself for consideration into two parts: (1) How can we increase speed with the present available engines? (2) What new developments in engines are needed to give better performance?

The total head resistance of an airplane may be divided into: (1) Drag resistance of the planes, a fraction of the lift. (2) Resistance of the struts and wires supporting the wings. (3) Resistance of the landing gear; and (4) resistance of the body or fuselage, governed largely by the shape of the engine, the size of the radiator, etc.

The last item, the body resistance, on the usual tractor types is very great; in fact, on a fast machine, it is the preponderant resistance, due not only to the bulk of the body, but to the fact that it is placed in the slip stream of the propeller, in an air velocity 25 per cent greater than the speed of the airplane itself. We may look, therefore, to a refinement in the contour of the body, and particularly in a closing up of the various cowling gaps around seats, to reduce body resistance. In considering this it becomes very apparent that the Gallaudet system of propeller drive around the body at the rear, without the awkward structure of the ordinary "pusher" type, has a very real engineering advantage.

The structural resistance of the landing gear is obviously subject to complete elimination by a mechanical method of folding it into the body, as has been proposed by several engineers here and abroad for several years. Struts, and, above all, wires and cables, are being eliminated very rapidly in various modifications that have been developed. Gradually, in reducing the amount of bracing, we are approaching the interior baced wings, which have attracted many designers. A wing structure with somewhat thicker wing sections, requiring no outside bracing, and completely eliminating the structural resistance of bracing struts and wires, has already been built successfully in this country by several people, including the writer, and it is found that the weight is not excessive; and the thicker wings, offering room for fuel, radiators, etc., reduce the necessary size of the body, and consequently its resistance.

Beyond these features there is not much that can be done with the same engines, excepting to build the airplane lighter and therefore smaller, and lower in that criterion of performance, low pounds per horsepower. . . .

Improvements in Engines

Streamline shape, however, is not the only big item in which engines can be improved. Their shape and arrangement for mounting in the airplane are subject to profitable modification. We too frequently overlook the fact that the total weight of an engine is greater than its weight bare. The engine, due to its design, demands a certain arrangement of radiator, a certain cowling, and what is more important on practically all upright engines today, a heavy, complicated, and generally bad design of engine bed. The reason for this is that we are using mostly the automobile type of engine. What we need is an airplane type of engine, where these fundamentals are studied as the important basis for design, and not relegated to be "co-ordinated" afterward by the airplane constructor. A modification in the engine requiring less in weight of engine bed, or cowling, or doing away with extra fuel-pumps, water headers, etc., offers far easier means of reducing the total weight than lightening of the crankshaft, and *it is the total weight of the airplane in the air that counts—not the weight of the engine on the block.*

With a few improvements in reducing airplane resistance incorporated on a 300 or 400 hp., three-seated machine, with a new engine of small size and carefully studied shape, speeds of 200 miles per hour are actually possible without introducing anything new to the art of flying,

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Cooperstown A. S. Hospital Nearly Ready

The hospital established at Cooperstown Lake, N. Y., built by the Clarke family at a cost of a million dollars as a gift to the town, but donated to the Air Service for a period ending a year after peace is signed, will be ready for occupancy in about a month.

A much smaller building located in the hospital grounds was made available several months ago, and 40 aviators have received treatment there and have been discharged for duty.

Seventy fliers who are in need of recuperation are now under treatment in the temporary hospital. The commanding officer is Major Francis H. Poole. This hospital was established under direction of Gen. Lyster.

Bossing an Army Kitchen in France!

"Bossing" an army kitchen in France on a motorcycle, shouting orders through a megaphone, mashing potatoes with a pile driver and carting away egg shells with a steam shovel are some of the few things a mess sergeant is supposed to do "over there."

At least that's what a friend of Private James Britton, a convalescent in Walter Reed Hospital, says he did in a letter which is printed in today's issue of the *Come-Back*, the hospital weekly newspaper. Here's the letter, read it, it's a humdinger that'll make Ananias turn green with envy:

Gievres (Lorie-et-Cher),
France,
November 23, 1918.

I notice a challenge from Ensign Fred Anderson of the Salvation Army. I accept the challenge if the proper arrangements can be made. I agree with him that for a griddle fry it was some fast work. Although not a member of the Salvation Army, I am the next thing to it. I am, or rather was, a mess sergeant in a noncombatant unit. While in this line of duty I was placed in charge of one of the largest camps in France. I dare not tell the name of the place, for it would cause every soldier in the A. E. F. to go A. W. O. L. to see this wonderful kitchen. I won't tell you the number of men we fed there, for I don't want to give the impression that I am trying to kid some one. Now for the kitchen. The kitchen was 928 ft. wide and 1358 ft. long, it took eighteen firemen to keep it hot; we had 519 cooks and 700 K. P.'s. We mashed potatoes with a pile driver and ground coffee with a 350 h.p. Liberty motor. They boiled out dirty pans on railroad cars and the K. P.'s went on roller skates.

As I was mess sergeant I rode up and down the kitchen on a motorcycle, shouting orders through a megaphone.

Now for the flapjacks. We mixed batter with twelve concrete mixers, had a steam shovel moving egg shells away from the door and six K. P.'s, with rinds strapped on their feet, skating over the griddle to keep it greased. When I tell you that on three occasions I was forced to fry all the cakes myself you will agree with me in thinking I would have some show in a contest with Mr. Anderson.

I am willing to take on anyone in the allied forces under any conditions they wish to name: blindfolded, handcuffed, one eye closed, one foot on the floor, turn 'em with a shovel, toothpick—well, any old way they care to do it.

Pardon this letter, as I am not a writer, I am a pancake frier, and what it takes to make 'em, I got it.

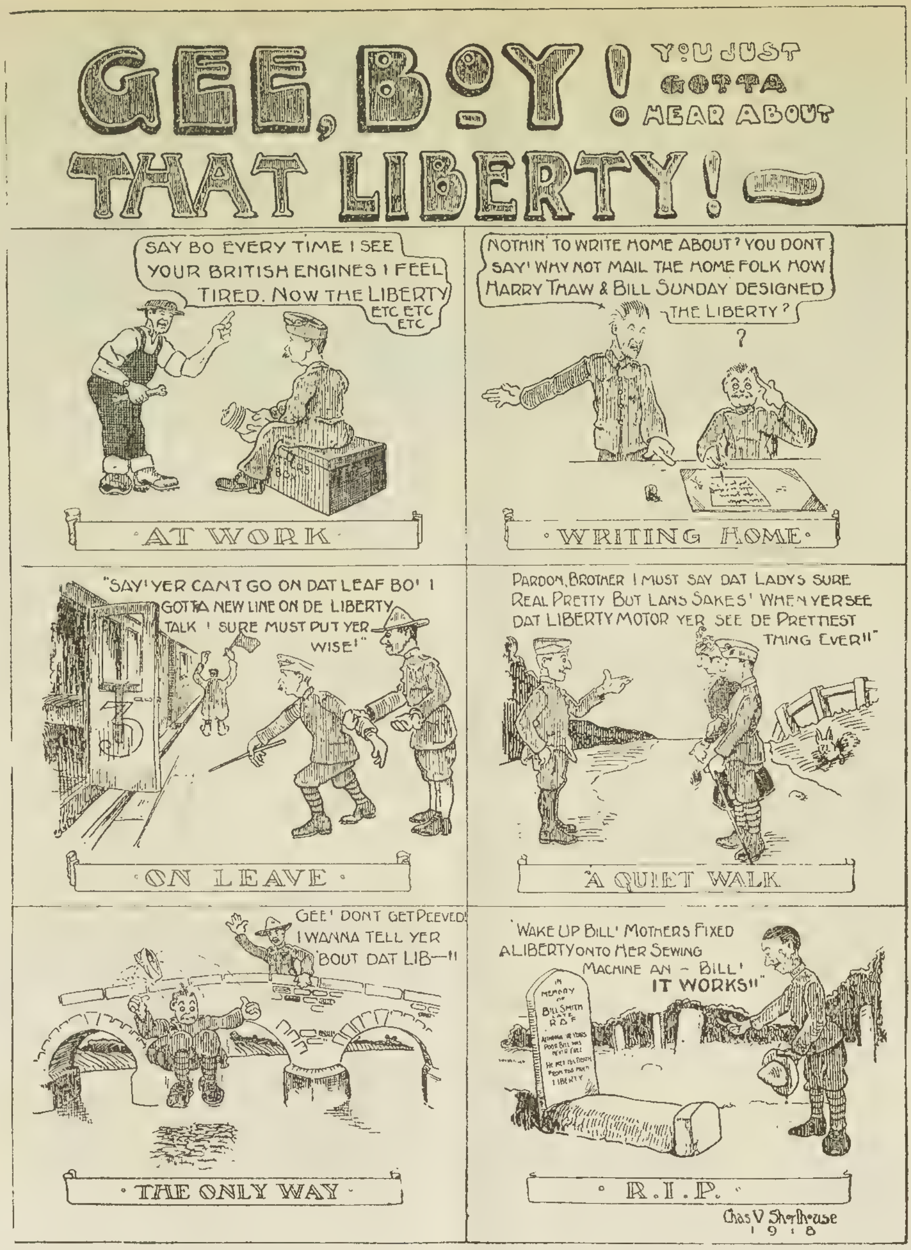
Clarence D. Brooks,
Air Service, A. E. F.

P. S.—Ensign Fred Anderson of the Salvation Army made 8000 hot cakes in seventeen hours.

This one point alone should answer the question: Will the air service man continue to fly? Yes, he surely will, and more than that, he will be instrumental in awakening the desire in others to travel across country at a speed of eighty miles an hour in the easiest riding transportation vehicle in the world. I specify eighty miles an hour, for this is the average speed of commercial machines which figure out favorably on mileage per gallon of gasolene with the present-day high-class auto runabout. Eighty miles an hour in perfect comfort, on a cushion of air that kills all vibration and puts the pneumatic tire to shame!"

N. G. Rost Home from Abroad

N. G. Rost, general sales manager of the Dusenberg Motors Corporation, has returned from a three months' visit in England and France and is again located at the offices of the company, 120 Broadway, New York City.


GEE, BOY! YOU JUST GOTTA HEAR ABOUT THAT LIBERTY!
SAY BO EVERY TIME I SEE YOUR BRITISH ENGINES I FEEL TIRED. NOW THE LIBERTY ETC ETC ETC
AT WORK
NOTHIN' TO WRITE HOME ABOUT? YOU DONT SAY! WHY NOT MAIL THE HOME FOLK HOW HARRY THAW & BILL SUNDAY DESIGNED THE LIBERTY?
?
WRITING HOME
"SAY! YER CANT GO ON DAT LEAF BO' I GOTTA NEW LINE ON DE LIBERTY TALK! SURE MUST PUT YER WISE!"
3
ON LEAVE
PARDON, BROTHER I MUST SAY DAT LADYS SURE REAL PRETTY BUT LANS SAKES! WHEN YER SEE DAT LIBERTY MOTOR YER SEE DE PRETTIEST THING EVER!!"
A QUIET WALK
GEE! DONT GET PEEVED! I WANNA TELL YER 'BOUT DAT LIB—!!
THE ONLY WAY
WAKE UP BILL! MOTHERS FIXED A LIBERTY ONTO HER SEWING MACHINE AN — BILL! IT WORKS!!"
IN MEMORY OF BILL SMITH LATE R.A.F.
R.I.P.
Chas V Shorthouse 1918

From the *Aeroplane*

CONFESSIONS OF AN AVIATOR

By "Aviator"

What a glorious night! The drinks, the eats, the girls! I feel like a squadron commander! Why shouldn't I? I could loop, tail-slide, or do anything!

Morning—a swollen head, cold feet, a miserable quirk! It looks as if it might rain—I'll bet its bumpy—no, the sun is shining, and the sky clear, yet my feet register zero.

Hey, you over there! Get your rigging on and take up number 2884 for an hour and try to make a height record for yourself! Oh, how cruel those words are! Yet a command is a command and must be obeyed.

I crawl over to the machine, and curse Hades that such things as flight commanders were ever invented.

"Switch-on; switch-on!" A pull of the prop and the engine starts. What a comforting sound—like a hand-organ at your window on Sunday morning! Only a trifle more irritating.

"I think the engine's missing a bit."

"No, sir it's making 1200 revolutions."

"Control seems a bit stiff."

"No, they're all right, sir."

"Is there lots of gasoline?"

"Yes, sir, the tank's full."

"Oh, Hell, let her go!"

I grab the joy-stick—what a glorious life—what a damn awful life!

I must be up 5000 ft.—I'll have a look at the altimeter. No, it only registers 300 ft. These damn instruments are no good. Either it's wrong or I'm wrong, and I know I'm over 300 ft. Swish—a gust of wind on the side of my face. I guess I side slipped—but perhaps the wires are loose. Nose down—switch off—a glorious glide to earth—a wonderful bounce—a broken prop and an introduction to the C. O.

No more nights for me.

HUH-UH, NOT ME

(Reprinted by Request)

C'ose ah ain't saying ah won't do
Des what ma country want me to,
But dey's one job dat ah, fo see
Ain't gwine to 'tach itself to me.
Huh-uh, not me.
Dat's dis heah ahplane stuff—no boss,
Ah'll pack some othah kin ob cross
Lak, drive a mule, or tote a gun,
But ah ain't flirtin' wif de sun.
Huh-uh, not me.
Ef ah mus' do a loop de loop,
Let mine be 'round a bowl of soup.
'Taint gwine to be up whar de crows
Kin say ah's trompin' on deh toes.
Huh-uh, not me.
It sho look sweet, ah don't deny,
To be a-crossin' 'roun de sky,
But dat's fo folks dats in de mood
To pass up love, an' gin, an' food.
Huh-uh, not me.
Down heah ah firs saw light ob day,
Down heah am whar ahs gwin to stay
Folks, ah don't keer to hab ma feet
Get too blamed prowed to walk to street.
Huh-uh, not me.
So ah'll des wait till Gabrel brings
Dem good ole-fashioned angel's wings,
Den as ah pass de ahplane by
In pity, ah'll look down an sigh.
Huh-uh, that's me.

Just Smokes

By Melville Chater

The telephone bell rang.

The Red Cross Canteen worker jumped to her feet and answered it.

"Another troop train—1200 men—due in two hours," she threw back the phrases over her shoulder between the breaks in a bad connection.

The canteen had already fed 9000 troops at the trainshed that day and as it was well along toward midnight the workers had turned in for a few hours' rest. But in twenty minutes the entire force was again at work making sandwiches and coffee.

The train came in covered with American soldiers as an ant hill is with ants. They had been in France only a few weeks but on the morrow they would be thrown into the great allied offensive; they would taste real warfare for the first time. In rollicking spirits they were singing the "Doughboy's Song."

"Good-bye, paw, good-bye, maw,
Good-bye, mule, with your old hee-haw,
I don't know what this war's about
But you bet, by gum, I'll soon find out.
(With long drawn tenderness)
Good-bye, my sweetheart, don't you fret;
I'll come back all right, you bet.
I'll bring you a Turk and the Kaiser, too
(with modest restraint)
And that's about all one feller can do."

Quickly they filed past the Red Cross women distributing "the eats."

"Whoop-la, cigarettes," came from one observant youth, and the rest took up the cheer. They had run out of tobacco and the majority of the men had not had a smoke that day.

"Only one each, boys," warned the suddenly popular canteen worker; "they are very scarce just now." As each man had his mouth full, the precious cigarette was tucked securely back of his ear.

Suddenly a hush fell upon the troops. Through the darkness a second train with a big Red Cross breaking its drab sides rolled slowly in on an opposite track. It was a hospital train from the front.

The fresh troops pressed close to the sides of the car carrying their wounded brothers.

"How is it going up there?"

"We're giving them hell. Where you fellows headed for?"

"Where you just came from—the front."

"Give 'em more hell and good luck to you."

And so the fragments of conversation were thrown back and forth. Meanwhile there had cropped up a certain bit of information which was echoed all through the fresh troops.

"What, those fellows got no smokes? We got the last?"

And in three minutes the Red Cross workers had their big cigarette bowls filled again and were making a second distribution in the hospital car.

A few minutes more and the troop train was under way. As the boys aboard hung out of the windows to give a final cheer to the heroes they were leaving behind the last sight they beheld was that flickering patch of light points in the darkness.

And they turned to their song—

"I'll bring you a Turk and the Kaiser, too,
And that's about all one feller can do."

Air Service Sick and Wounded

Sick and wounded men of the Air Service flying personnel, on arrival at ports of debarkation, will be sent to U. S. A. General Hospital No. 2, at Fort McHenry, Baltimore, Md.; or if already convalescent to the Air Service Depot, Garden City, L. I., according to instructions issued by Surgeon General M. W. Ireland to all Port of Debarkation surgeons and Debarkation Hospitals, Feb. 3.

Flying personnel patients arriving at general hospitals, when already convalescent, will be sent direct either to the Military Convalescent Hospital, Cooperstown, N. Y., or to the Air Service Depot at Garden City. Transfer history will be sent with the patient in all cases for presentation to the Medical Board at the Air Service Depot, Garden City.

Vanquished the Last Boche Plane

In the AIR SERVICE JOURNAL of Dec. 28, 1918, Major Maxwell Kirby, A. S., A. E. F., was credited with having brought down the last boche machine on the western front before the armistice was signed. It has since developed that there was one brought down later, and the official citation follows:

OFFICE FIRST ARMY AIR SERVICE COMMANDER, AMERICAN EXPEDITIONARY FORCES.

FRANCE, Jan. 28, 1919.

GENERAL ORDERS, NUMBER 5.

EXTRACT.

* * * * *

8. First Lieutenants George S. Clark and Mortimer M. Lawrence, pilot and observer, respectively, and Second Lieutenants George L. Ohrstron and Joseph B. Mallory, pilot and observer, respectively, 104th Aero Squadron, 5th Corps, Observation Group, are hereby credited with the destruction, in combat, of an enemy Fokker, in the region of Moulins, at 4200 meters altitude, on Nov. 10, 1918, at 13:15 o'clock.

BY ORDER OF LIEUTENANT-COLONEL JOHNSON:

H. M. GALLOP,
Captain, A. S., U. S. A.,
Assistant Chief of Staff.

OFFICIAL:
H. S. STURGIS,
1st Lt., A. S., U. S. A.,
Adjutant.

True Extract Copy:
E. A. MAHER,
1st Lt., A. S., U. S. A.

New Continental Flights Planned

Some new transcontinental flights are planned for the near future.

Major Tom C. McCauley intends to use the Southern route and double the continent, San Diego, Cal., to Savannah, Ga., distance about 2,460 miles each way, via Americus and Fort Worth, Texas. He will use the DH-4, fitted with extra gasolene tanks, stopping at fields en route to change planes. He hopes to average over 1200 miles a day and double the continent in four days.

Major McCauley contemplates starting from Fort Worth, Texas, and make a non-stop flight to Souther Field, 1109 miles; change planes and go on to Savannah, 174 miles—this in one day. Returning he will pick up a plane again at Americus and continue on to Fort Worth. Thence to San Diego and return to Fort Worth, where he is stationed.

Major McCauley, it will be remembered, called at Souther Field en route to Florida a few weeks ago and was missing a few days in the Florida swamps, having been forced to make a landing south of Jacksonville.

This test and that of the Handley Page practically will establish Americus, says the *Times-Recorder*, as an important relay change plane station on the transcontinental route, and the visit of the special representative of the Postmaster General's Department to Americus is another straw that tells which way the wind is blowing.

Navy Flying Boat In Fast Trip

Two of the navy's flying boats of the F-5-L type, one of them carrying six men and the other five, flew March 12 from Hampton Roads, Va., to the naval station at Rockaway, a distance of 300 miles, in exactly 270 minutes. This feat, according to Lieutenant W. L. Richardson, in charge of the flight, established a new record for aircraft of this type.

The two seaplanes left Hampton Roads at 10 a. m. and landed four and a half hours later at Rockaway. The first boat was piloted by Ensign R. Southers, who carried with him, in addition to Lieutenant Richardson, three enlisted men as passengers. Ensign Irvine piloted the second plane, which carried five navy men. Both boats carried heavy photographic equipment.

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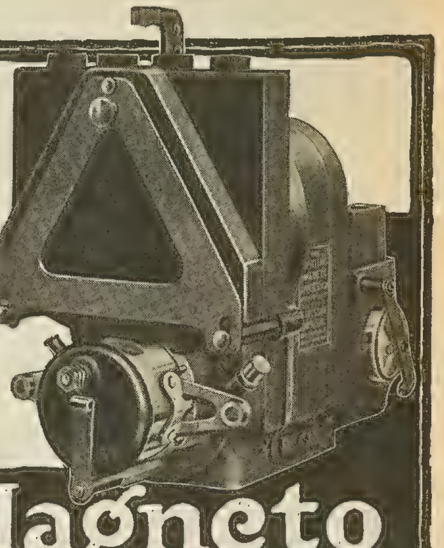

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Will Store Many Army Airplanes

The decision of the War Department to maintain sixteen flying fields and three balloon fields as a part of the permanent military establishment was announced March 12 by Acting Secretary Crowell. The department also has practically decided, Mr. Crowell said, to store for possible future use the hundreds of elementary and advanced training planes used during the war.

Secretary Crowell said that department experts did not believe the training machines would deteriorate, if carefully stored, even after a period of years, nor did they believe that improvement would be made in these types which would make them useless.

Fields to be retained and now leased will be purchased by the Government. Actual instruction in flying will be conducted at only two fields. The fields to be retained have not yet been decided, but the Secretary said that two would be near Newport News, three on the Pacific Coast, one near New York, three in Texas, two in Florida, one in Mississippi, one on the Great Lakes, and one each in Georgia and Oklahoma.

Airmen in Plight Assisted by Oxen

Probably the first instance where an airplane reecived assistance from a yoke of oxen took place last Monday at Middleburg, Va. Lt. Col. B. F. Castle and Captain Clyde Dunnington were flying cross country and were forced to land in a field near Middleburg, Va. The mud was so thick they could not get out, and even after the assistance of various townspeople they were unable to move the machine. When they were nearly exhausted and quite discouraged, there appeared coming over the hill a yoke of oxen attached to a farmer's cart.

The driver consented to assist the airmen and, backing up to the plane, coupled on and pulled them to solid ground from which they took off easily.

"Call Me an Aerial Taxi!"

The first aerial taxi depot in the world will be established within the next two months by the Curtiss Aeroplane and Motor Corporation at Garden City, Long Island, stated Mr. Glenn H. Curtiss in discussing the commercial outlook for the aeroplane.

"I understand," said Mr. Curtiss, "that at bombing and photographic schools the pilots used to call, 'Taxi!' when officers or cadets appeared for flight. The cry was considered a joke. But it will soon be a common one, seriously and practically uttered.

"Speed runs modern business. And," says a British authority, 'Whatever the cost, the business to be done at a certain hour can be done only by arriving on time.' This is truer of America than of Europe. If it is highly desirable to be in Buffalo or Cleveland within four hours, or at Albany in one, the business man will get there if it is possible to do so.

"We are going to make it possible. We shall have a taxi depot which will furnish small machines for short intercity travel (that is, anything less than 200 miles) on order. Experienced pilots will be available to drive these airplanes, and the total cost will be surprisingly reasonable. It certainly will not exceed that of many an automobile trip which a missed train entails, for we save on the pilot's and the ship's time even if we may have a larger running cost to meet."

That Trip to the San Blas Indians

Reporting further from France Field, Cristobal, Canal Zone, on the San Blas trip, the Information Officer writes as follows:

EXPLORATION—This week a flight was made to San Blas, R. P., in an HSIL flying boat, a distance of 180 miles being covered in about 140 minutes. On the trip to San Blas the boat carried four passengers (including pilots) and about 200 pounds of extra equipment. Two of the passengers were Air Service men who are on hunting pass, and in addition will make a hurried survey of conditions in the San Blas territory.

The San Blas tribe of Indians is an old race, with many historical traditions. They have never been conquered, and the Panamanian Government is making some effort to educate them and to strengthen their allegiance to the Republic. A peculiarly shy and child-like people, these Indians have many habits of dress and adornment which are interesting. All their women wear nose rings of imitation gold almost from infancy, cover their heads and faces with cheap cotton shawls of elaborate design, wrap their legs tightly with a fabric strip and paint a stripe of varying color on their noses. The chief men are distinguished by circular ear-rings, also of imitation gold.

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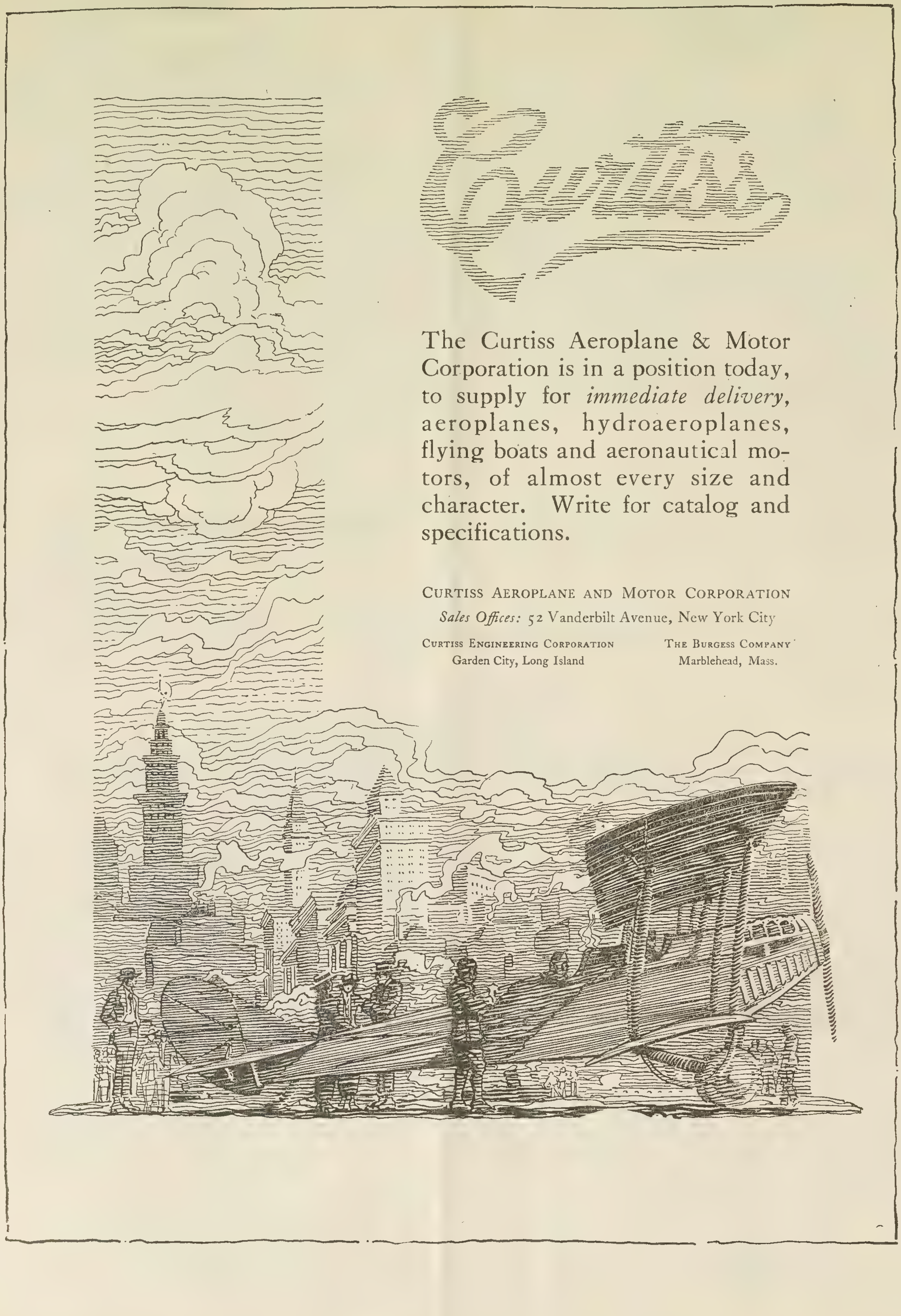

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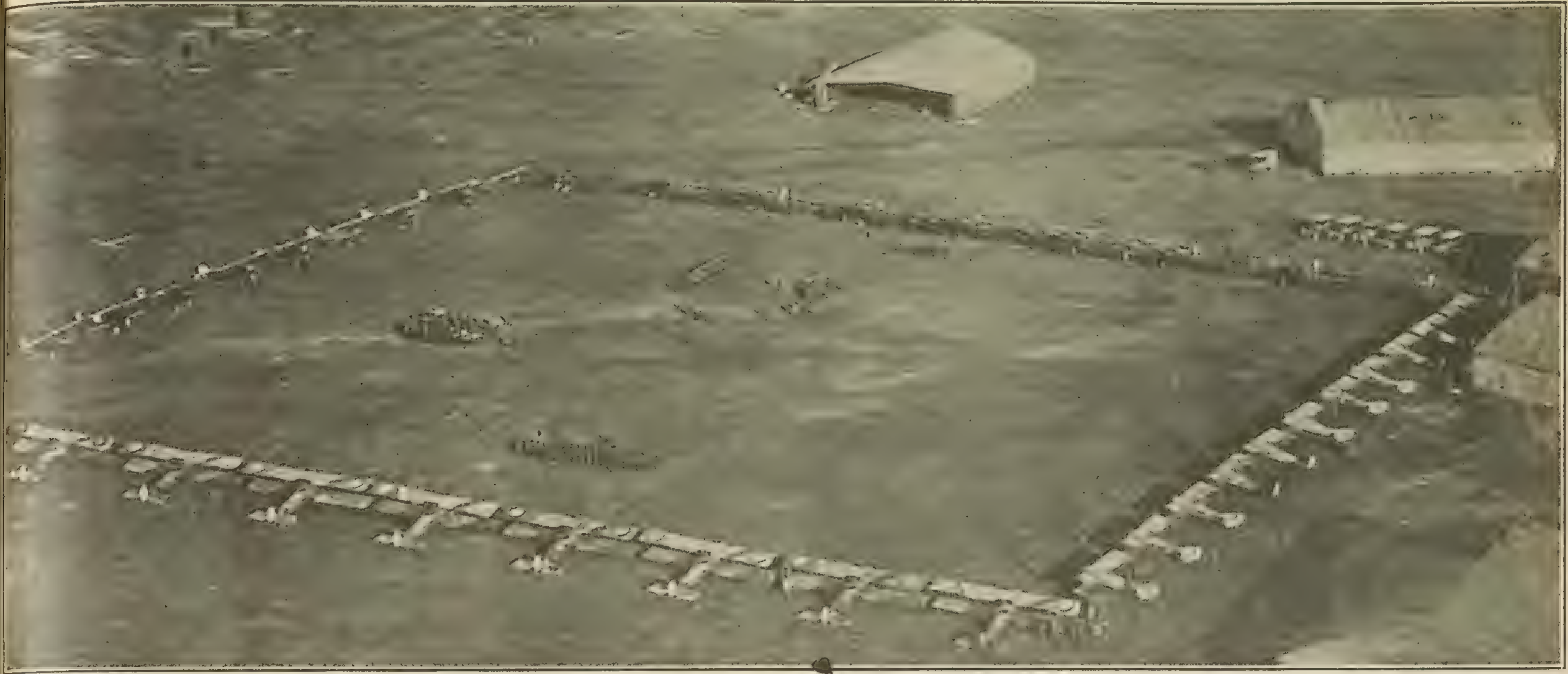
AIR SERVICE JOURNAL

The National Aeronautic Newspaper

VOL. IV. No. 13 NEW YORK, MARCH 29, 1919 PRICE 10 CENTS

American Air Service Conquerors in Germany



The above picture of American Air Service Squadrons at Coblenz shows the three American Air Squadrons that reached the Rhine and were patroling that famous waterway. The 94th, our oldest Pursuit Squadron; the 91st, our oldest Reconnoissance Squadron, and the 12th Squadron are on three sides of the quadrangle, the other side being lined with captured German Fokkers. The occasion was the presentation of decorations to our pilots and observers by Brigadier-General William Mitchell. German training trenches and shell craters can be seen in the background.

GOVERNMENT MAY BUY OLD DAYTON FIELD

Considered by General Menoher and Other A. S. Officials

PERMANENT BASE AT DAYTON

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The purchase of the Dayton-Wright Experimental plant and a big acreage at Moraine City, movement of buildings and the entire equipment of McCook's Field to the new location, and the permanent establishment of Government aeronautical activities in Dayton was considered at a conference of the Technical Section officers and General Menoher at Washington last week.

This plan involves an actual expenditure of several million dollars in addition to the movement of more than $10,000,000 worth of Government property now located at McCook Field.

Col. T. H. Bane, commanding officer of McCook's field, under the reorganization of the air service becomes chief of the engineering division of the United States air service.

The order also places all activities of the engineering division of the air service, including the development, testing and experimental work in aeronautics in Dayton.

Col. E. A. Deeds is also in Washington, and is said to be attending the conference which has in view the purchase of the Dayton-Wright Airplane plant and the permanent establishment of the engineering division of the United States air service in Dayton.

British Air Transport Developments

There is no doubt whatever that the romantic aspect of air transport problems and possibilities has made the British business men who are concerned with them far more imaginative and openminded than they could otherwise have been. The most astounding schemes abound on every hand, the American Chamber of Commerce in London reports, and are earnestly considered by men with millions to spend.

Between fifteen and twenty firms and partnerships are reported to be preparing to open training schools for civilian flying. A dozen firms are making "sporting" models and "touring" models.

Senators Fly Over Capital

A flight over Washington was made March 22 by Senators King of Utah, Sterling of South Dakota and Fletcher of Florida, in a four-passenger bombing airplane piloted by Capt. Roy Francis.

FITTING NC-1 FOR THE TRIP OVER THE SEAS

Four Liberties, Giving About 1,600 Hp., Being Installed

FLIGHT WITHIN SIX WEEKS

American Destroyers to Make a Lane for the Seaplane, Constantly in Touch by Wireless

The American navy's powerful seaplane, NC-1, will probably begin its trans-Atlantic flight within six weeks.

Work on the NC-1 seaplane to increase its fuel carrying capacity is being pushed rapidly, and the ship is expected to be ready for trial trips shortly. The three motors have been replaced by four Liberties, giving approximately 1,600 horse power.

American destroyers will be used to make a lane for the seaplane to follow in its trans-ocean fight, and wireless communication will be constantly maintained with the American navigators of the air and the sea.

Commander J. H. Towers, U. S. N., designated by Secretary Daniels to arrange all details of the flight on March 19, summoned Lieutenant Commander Patrick N. L. Bellinger, commander of the navy's air base at Norfolk, to report to

(*Continued on page* 9)

BRITAIN'S TRY MAY COME NEXT WEEK

Harry Hawker, in a Sopwith, to Start from Mount Pearl, N. F.

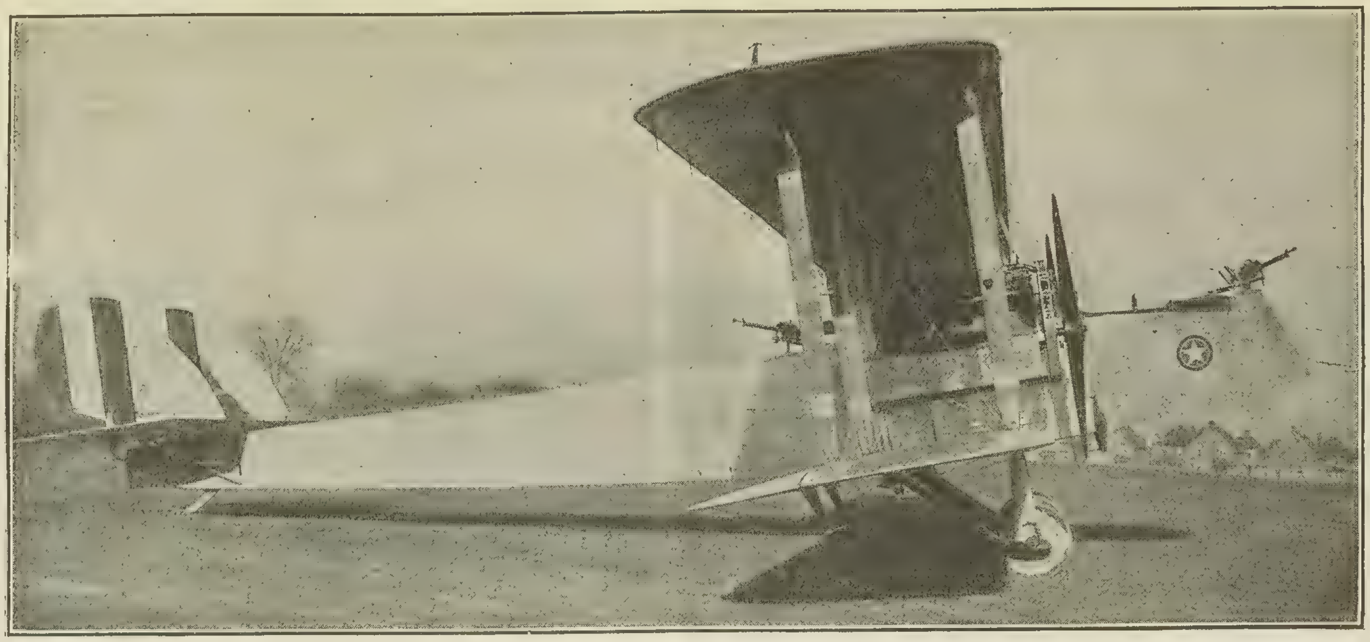
TWO ADDITIONAL ASPIRANTS

Flying Boat Named After Lieut. Col. John C. Porte Will Be the Entry of the Government

A secretly built airplane, accompanied by a pilot and an officer of the British Navy, have left England in preparation for an attempt to win the prize of £10,000 offered by the London *Daily Mail* for the first machine to fly across the Atlantic.

At 1 P. M. March 18 the managing director of the Sopwith Aviation Company placed the necessary £500 deposit with the Royal Aero Club and entered in the competition a Sopwith two-seater with a twelve-cylinder, 375-hp. Rolls-Royce Eagle engine, remarking that the airplane even then was being taken to St. John's, Newfoundland, after having been secretly constructed in two months at great pressure. The machine is 46 ft. wide, 31 ft. long and has a flight duration of 25 hours at 100 m.p.h. Its 375-hp. Rolls-Royce engine has twelve cylinders with four magnetos, each firing

(*Continued on page* 9)



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Vol. IV NEW YORK, MARCH 29, 1919 No. 13

Big Airplane Program Ahead

The plan of the Chief of the Air Service, General Chas. T. Menoher, to immediately develop the aviation branch of the Army on broad constructive lines will be received enthusiastically by the public. At a time when the future of the Air Service looked doubtful and every constructor was confronted with a period of idleness, a comprehensive plan of immediate construction is of the utmost importance. The prospect of the addition of a thousand combat planes to our air force is the most important news that has appeared since the war ended.

The U. S. Air Service has no pursuit, day or night bombing or two-seater fighters except those which have been produced experimentally. This shortage would leave the Army in a critical situation at a time of need and General Menoher and his staff are to be complimented for their farsightedness in proceeding at once on a program which can utilize some of the present funds which become unavailable after June 30 of this year.

So much inaccurate information has been published recently regarding the Army Air Service that the public has received the impression that the whole arm is to be scrapped and a billion dollars of war funds wasted. The propaganda behind such misinformation is well known to official Washington and up to now what has been planned has been kept secret.

The arrival in this country of the officers who have been in charge of air operations at the front has had much to do with the formulating of large plans for an immediate development of our air defense. These officers are not concerned with "peace programs." They believe that the Air Service should at all times be ready for war and that in this strength lies the best preventative of war.

Specifically it is planned to purchase outright sixteen of the present fields and continue the lease of ten others. Supply and repair depots will be maintained. Present equipment will not be scrapped, but if any is needed for the development of commercial aviation it will be sold where it will advance the general use of the aeroplane.

Recommendations have been made and will probably develop into definite orders for approximately 1,000 aeroplanes of types this country is lacking. Owing to the fact that during the war we could secure pursuit and bombing airplanes from the French only experimental types were manufactured in this country. At the present moment, if we were in difficulties with any country we would have only one type of fighting machine, and that out of date. The public will be eager to know that the billion dollars which was spent on the Air Service is to be utilized in making the United States impregnable in the air.

Another fact which has been overlooked is that the Air Service can now enlist mechanics who wish to continue. At present this has to be done through the infantry, but it is enabling the service to retain men until such time as the new organization of the army is decided upon.

The fields that are to be purchased are: March field, Riverside, Cal.; Mather Field, Sacramento, Cal.; Carlstrom Field, Arcadia, Fla.; Dorr Field, Arcadia, Fla.; Ellington Field, Houston, Texas; Kelly Field, No. 2, San Antonio, Texas; Park Field, Memphis, Tenn.; Souther Field, Americus, Ga.; Selfridge Field, Mt. Clemens, Mich.; Chanute Field, Rantoul, Ill.; Scott Field, Belleville, Ill.; Balloon School, Arcadia, Cal.; Brooks Field, San Antonio, Texas; Engine & Plane Repair Depot, Montgomery, Ala.

The fields where leases are to be extended are Wilbur Wright Field, Dayton, Ohio; Taylor Field, Montgomery, Ala.; Payne Field, West Point, Miss.; Eberts Field, Lonoke, Ark.; Gerstner Field, Lake Charles, La.; Call Field, Wichita Falls, Tex.; Taliaferro Field, Fort Worth, Tex.; Carruthers Field, Fort Worth, Tex.; Barron Field, Fort Worth, Tex.; Love Field, Dallas, Tex., and Rich Field, Waco, Tex.

This decision to continue in operations these large airdromes indicates that a large program is to be laid before Congress when it convenes.

These three decisions to retain flying fields, purchase equipment and retain personnel should receive the widest publicity so that the public may be given the opportunity to express their approval of the program. The War Department has been reluctant up to the present to give any orders or make plans for the extension of any branches of the army, but probably the alternative of being without pursuit or bombing airplanes was too dangerous to be considered.

The Navy, too, seems to be awakening to the large part aviation is to play in all fleet operations. Experience overseas has demonstrated the importance of aircraft for scouting as well as for spotting and fire control. Every officer in the naval establishment has become aware of the great advantages of airplane fire control over the older methods and the time is not far distant when every capital ship of our fleet will have its own airplane equipment.

The Post Office Department has $860,000 with which to extend its postal routes and intends to do this as soon as possible. The difficulty ahead of all such programs is the time element in securing suitable equipment. The whole tendency of the aircraft industry has been to produce airplanes of military and naval value. To suddenly alter these types to commercial equipment has proven either expensive or impracticable. The result is that it will take time to secure machines which commercially will be profitable to operate.

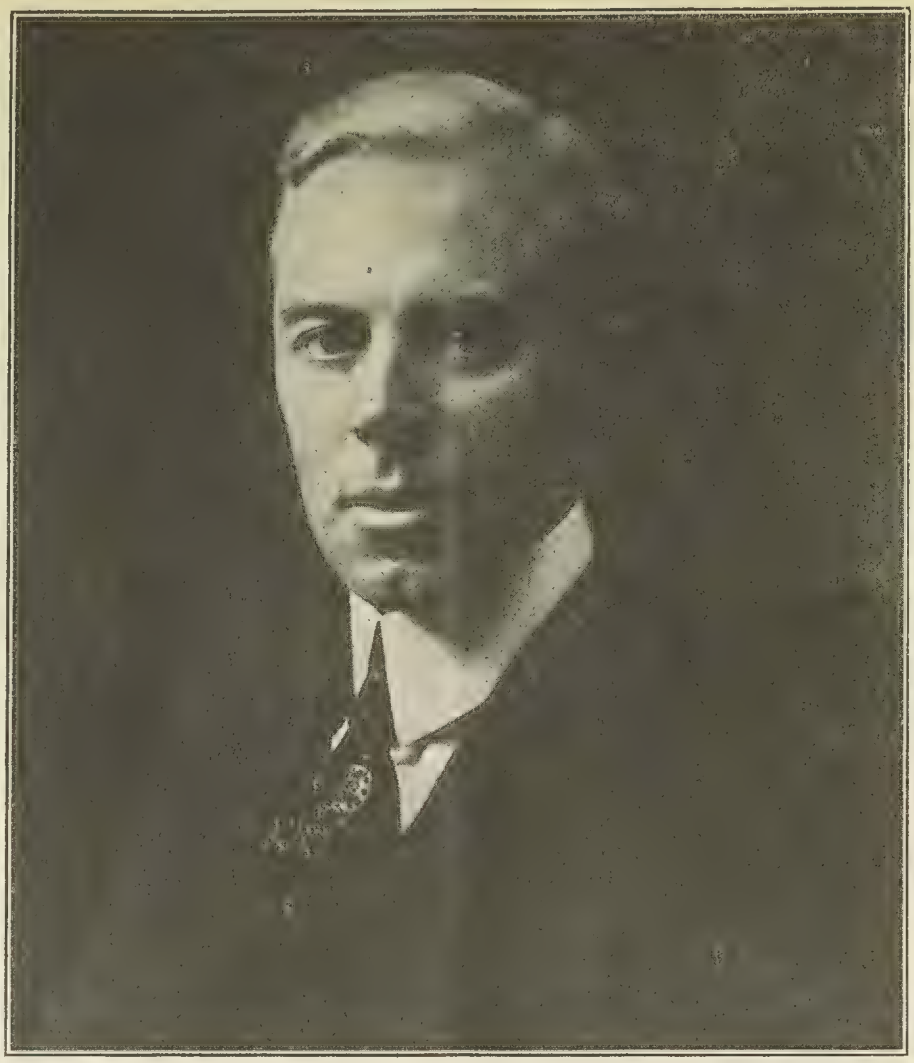
If any lesson has been learned from the war it is that such war equipment as the tank, airplane and ordnance cannot be extemporized in time of war. These services must operate with an eye to the distant future and the production of types be commenced long in advance of the actual need to be available at the beginning of hostilities.

This country must have airplanes for pursuit training and pursuit combat which are faster and better than any other machines in the world if the army is to maintain its bombing, reconnaissance and photographic work in war. To secure these will require the encouragement of private constructors and engineers to produce these types. To wait six months even would place the United States far in the rear, whereas now it can boast of the fastest machines in the world.

An Accurate Outline of the Air Service Situation in Washington

The following outline of the situation in Washington relating to the Air Service is so accurately stated by The New York Times that it is reproduced hoping that the information it contains may give the readers of the AIR SERVICE JOURNAL *a general idea of the present status of the various points of view held in different quarters.*

(From the New York Times, March 23, 1919.)



Lawrence La T. Driggs, First President of the International Air Service Club, 9 and 11 East Thirty-eighth Street, New York

Press Illustrating Service

Generally distributed speculation and some local stirs were caused by the recent cutting off of heads in Washington when William L. Kenly, chief of the military part of the army air service since last May, suddenly ceased to be that and from a Major General in the air descended to be a simple Colonel of artillery in the field. Some prophets immediately predicted the end of all aerial activities, the scrapping of all the war's accumulation of airplanes, and the curt dismissal of several thousands of ex-civilian fliers and ground officers eductated at vast trouble and expense to the public and considerable danger to themselves and—some of them—tried out on the western front and graduated with honors as aces.

All that anybody really knew was this: That Major Gen. Kenly was gone from Army Air Headquarters and Major Gen. Charles T. Menoher, recently commander of the Rainbow Division over in France, was giving orders there instead. As a matter of fact, General Menoher had been there behind the scenes for many weeks—gradually creating a new organization out of the old which the cessation of hostilities had left, but ill-adapted to a peace program.

The disappearance of General Kenly was, therefore, only an incident and the real problem of the country's future aviation activities remained as before the reconcilation of conflicting interests in the army and navy, and outside of both and the creation of a policy and a program for the whole country—a program looking to naval, military, and commercial needs.

That is why those who in the last months of the war advocated the creation of an independent Department of Air, as the only possible way to meet the ever-expanding demands of the aircraft problem, will press that issue before the next Congress as the best way to clear away the difficulties and handicaps that now prevent the development of a service which all the leading nations recognize will in the future play a part of the first importance both in national defense and in commerce. At present aviation in the United States is drifting, and unless a unified program is soon established much of the progress made during the war will be lost, and it will take years to create anew the present advantages for the production of machines and the training of men.

What England Has Done

Right at the end of hostilities was announced a great navy program, to build a navy second to none. Yet the stage of development which aviation has reached is obviously such that there can be no navy second to none unless the nation with that navy possesses an air service second to none—that, in fact, aviation may become the dominant factor in national defense. This Great Britain recognizes. The English are determined to remain in the forefront of aerial development, and in order to be sure of retaining a position among the first made, more than a year ago, careful and elaborate plans to bridge over the gap between war and peace, and to convert for use in the peace period every possible asset created under the stress of war.

The Air Ministry, established to meet a war emergency, is continued as a permanent part of the Government, and will dominate all training and operations by air, control the regulation of all travel and traffic by air, and will encourage in every possible way civilian aviation, including scientific investigations for the improvement of all types of machines and every branch of the service. To carry out these aims $330,000,000, according to the budget estimate, is to be spent by the British Air Ministry in the fiscal year 1919-20. As far as practical the aviation industry built up during the war will be conserved, in pursuance of a policy which assumes that if the gap between military and commercial uses of airplanes can be bridged, not only will the present manufacturing facilities be needed, but large extensions be required. Meantime national and international air service routes are being planned on a grand scale and some are being put in operation.

In this country three departments have aviation programs of their own, the War, Navy, and Post Office. Two others have a direct interest in the development of aviation, since airplanes are needed by them. These are the Departments of Commerce and the Interior. It would be expected in the program for the ensuing year that the War Department would hold first place in all respects, for on it was placed the great burden during the war. In fact, in army and navy bills as finally amended and reported to the last Congress, but not passed by that body, the navy stood at the top with an appropriation of $35,000,000 as against the army's $30,000,000. Explanation of this may not involve the assumption that the central management of the Navy Department takes more interest in the development of aviation as a branch of its service than does the central management of the War Department, but the fact remains that the navy appropriation is larger. It is also true that the Navy Department is very strong on aviation and very jealous of any attempt to create a central authority over all aviation.

Situation in the Army

The War Department's interest in aviation, stimulated to extra efforts during the war by insistent public demands, plainly sagged after the signing of the armistice. In spite of the enormous expansion of aviation during hostilities and in spite of the patent fact that the use of airplanes has transformed the face of war as nothing else has since gunpowder came into general use in place of bows and arrows, there is actually at the present time no representative of the Army Air Service on the General Staff of the army, where the older arms of the service—all profoundly affected by the application of man's conquest of the air to warfare—have their stronghold. Designs entertained in that quarter have apparently involved a plan of no permanent air service commissioned personnel at all—but instead a personnel made up of officers temporarily assigned from other services—cavalry, infantry, artillery---as ordnance personnel was assigned from artillery. But good authority in Washington has it that the present idea of the General Staff is an Air Service branch of the army which shall be an arm like the cavalry in rank and importance.

In the Army bill that failed, the air service of the army, as approved by the General Staff, would have consisted of 22,000 men and 2,000 officers. In the air service itself there is strong belief in the future of aviation, and plenty of enthusiasm for a program of broad outlines, but so far this enthusiasm and the energy behind it have been held in check by the wall of the General Staff. The majority of the aviation officers see no possibility of the development through the General Staff of a service which they think must sooner or later take rank in importance with the army and navy rather than be a part of either or both. This position is not taken in any spirit of antagonism to the General Staff, but on the ground that the members of that body, out of contact with the achievements and possibilities of aviation, are not the men best qualified to lay down the right policy. Under such control, these officers believe, all great advancement will be held in check from lack of comprehension. Two arrangements are possible which do not involve this control.

First (the one most desired), the creation of an independent air department, which shall have charge of the training and equipping of the air services of the army, the navy, the marine corps and the Post Office Department; the control and regulation of all air travel and traffic in this country, which embraces the mapping of air routes, locating landing stations, and a mass of other detail, all of immediate importance in the development of the civilian side of aviation; the conduct of all Federal scientific investigations for the promotion of aviation, to replace the numerous bureaus now engaged on this work, no little of it duplication. Whether the air department, as proposed, shall limit itself to the training of men and officers, and the designing and supply of machines for the army, navy, and the Post Office Department, or whether it shall have a force of its own, with units serving with the army and navy as the marines of the navy did with the army in France, is a question on which there is a difference of opinion among those officers of the air service who stand for an independent department.

Second, to create an aviation department independent of the General Staff and reporting direct to the Secretary of War. This, it is pointed out, is what was done before any great strides were made in providing airplanes and aviators during the war. John D. Ryan, in the final lineup, as director in charge and Assistant Secretary of War, dealt directly with the Secretary of War. This, it is recognized, would only be a half measure, a step toward the unification of all the aviation branches and activities, but it would permit the War Department branch, as the most important of all, to take a course of unhampered progress and to lay the foundation for the merging of all interests later.

Question for Congress

There is no doubt, however, that the General Staff of the Army will oppose any move of this kind, and any officer who takes the lead in advocating such a plan is sure to come into conflict with that powerful body whose guiding principle is centralized control over all branches and bureaus having to do with the army, just as the guiding principle of those who advocate an independent aviation department is control over all branches of aviation. But weightier opposition faces the other plan, to create a department whether of cabinet rank or not, reporting directly to the President. The Navy, the Army, and the Post Office Department can be counted to fight it with vigor, for that would interfere with their individual programs. The initiative, therefore, will have to come from Congress, and it is here that the fight will be made. The logic of one department and a unified program has already appealed strongly to many Congressmen. In the debates in the last days of Congress over the Army, Navy, and Post Office bills, this was brought out numerous times. Representative F. H. La Guardia of New York, who served as an aviator in Italy during the fighting, said on the floor of the House when the Navy bill was being discussed:

"The trouble is we are dividing this thing. We have four departments overlapping. We took away $2,000,000 from the Post Office Department the other day. We have all these people dabbling in this, instead of having a comprehensive, united air department taking over all these subjects for the Government and accomplishing results and developing a big aeronautical industry in this country. For every American machine that went over the lines into Germany it cost us more than a superdreadnought. * * * Until we have a united air service in charge of competent technical men, we must watch aviation appropriations. Let us take the money away from them until they come to their senses. When they come to their senses they will have come together, and we shall have an air department the same as England and France have."

Mr. La Guardia sought to take $10,000,000 off the navy's aviation appropriation.

A majority of the influential Senate Committee on Military Affairs are for a Department of Air. They voted in favor of the plan and it was made a part of the Army bill as reported to the Senate, though the significance of it was lost sight of in the excitement of the filibuster. In the next Senate Senator Harry S. New of Indiana will be a leader in advocacy of such a measure. He is firmly convinced that that is the only way out of the present conflict of interests which is holding up the development of aviation.

Inertia to Be Overcome

It is obvious, however, that in order to establish a new department much inertia in Congress has to be overcome. A new department has usually begun with a small bureau and then grown up. But the present situation is different, according to the advocates of a Department of Air. Because, unless a central authority is created and some clear outline as to future plans drawn, the aidcraft industry created by the war, upon the maintenance of which an adequate air service fundamentally depends, is in danger of disintegration or large reduction in facilities.

Not unnaturally, what the manufacturers, who have been marking time since the armistice, hope to see adopted is a policy similar to that already initiated by England. The viewpoint of the manufacturers may be stated as follows:

"We do not ask, nor do we advise, the building of a large number of military types, but we urge that the Government be charged with the responsibility of devising a plan by which civil aeronautics may be stimulated, so that an aeronautical industry may be sustained and a force of pilots may be retained in training. If an effort in this direction is accompanied by intelligent experimental development of military types, we shall be able to secure to the nation all the advantages of a large military air force upon a businesslike basis that will provide for a substantial part of its upkeep through commercial operations. Within a few years this critical period of development will have been safely passed and commercial aeronautics placed on a self-sustaining footing. The Government will then be relieved of further responsibility in the development of the flying art and the nation will enjoy not only security, but a dominant position in civil aerial navigation."

Congress cannot escape some sort of legislation on aviation. Air travel and traffic require probably a closer regulation than steamboat and railroad transportation. An immense amount of work in laying out routes over States and in obtaining rights for landing stations is to be done, likewise in the institution of machinery, for the issuance of licenses, and the inspection of machines. There is as yet no legislation on these subjects.

Col. Archie Miller, A. S. A.

Commissioned First Lieutenant, 6th Missouri Volunteers, 1898—served with same in Cuba.

Second Lieutenant and First Lieutenant, 32nd United States Volunteers—served with same in the Philippine insurrection until 1901.

Commissioned Second Lieutenant, 2d United States Regular Cavalry—served with same in 1901 in Cuba.

Promoted to First Lieutenant, 6th Cavalry, in 1901—served three tours of duty with this regiment in the Philippine Islands and on the Mexican border, also in the Northwest country during the uprising of the Ute Indians.

Promoted to Captain, 6th Cavalry, April, 1911—detailed as Captain, Quartermaster Corps, May, 1912—assigned to supply work in connection with the purchase of animals for the Army for a period of four years; one year at Fort Keogh, Montana, Remount Depot, and three years at Fort Royal, Virginia, Remount Depot, the latter being considered the most complete and up-to-date remount depot in the world.

On duty with 2nd Cavalry, serving as Quartermaster at Fort Ethan Allen, Vermont, and later as Adjutant, Fort Myer, Virginia, being instrumental in establishing the two officers' training camps at Fort Myer in the spring of 1917.

Promoted to Major of Cavalry August 5, 1917, and Lieutenant Colonel of Cavalry August 15, 1917.

Appointed Lieutenant Colonel in Aviation Section Signal Corps October 1, 1917—on duty in the Office of the Chief Signal Officer, Washington, D. C. (Aviation Section), until November 15, 1917. In command of Kelly Flying Field, No. 2, San Antonio, Texas, November 20 to December 15, 1917, commanding Aviation Camp, Waco, Texas, December, 1917, to May, 1918, which is one of the largest aviation concentration camps in the United States.

Appointed Colonel Air Service to rank from September 26, 1917. Commanded Camp Greene, N. C., and Aviation Mobilization Depot in May, June and July, 1918.

Commanded Air Service Depot, Garden City, Long Island, August, September and October, 1918.

Appointed Chief Supervisor Air Service, October 18, 1918.

Appointed Acting Asst. Dir. of Mil, Aeronautics December 1, 1918.

Appointed Chief Executive Dept. of Mil. Aeronautics, February, 1919.

Holder of Congressional Medal of Honor for distinguished service in action. This medal is conferred by Congress and the few who receive it are decorated by the President of the United States in person.

The War Department issues licenses to civilians, but the authority to do so rests on an order issued by the President. The need of some action here without delay was seen by the National Advisory Committee for Aeronautics and a measure introduced in Congress placing the issuance of licenses and all rules and regulations for the navigation of aircraft in the hands of the Department of Commerce, but Congress adjourned without acting on the recommendation.

Whatever the scope finally given for development of aviation, the officers of the army Air Service will make the most of their opportunities as at present defined. There is general satisfaction with the reorganization plan of the service announced by Major Gen. Menoher, the new Director of Air Service, who, after the armistice, was detached from the Rainbow Division, which he commanded, and brought over to take Mr. Ryan's place when the latter resigned. Since then General Menoher has been making a study of the two ends of the organization, production and aeronautics, for the purpose of arriving at an effective permanent form of organization.

The two war branches were created under emergency conditions. They were confessedly temporary, nor did they ever cease to function imperfectly, built separately, as they were, and only merged finally under the authority of Mr. Ryan, a supplementary war expedient. The new organization consists of four divisions in which are embraced the functions and departments of the old organization that require continuance. These, with their chiefs, are: Supply, Colonel William E. Gilmore; information, Major Horace M. Hickam; training and operations, Brig. Gen. William Mitchell, and administration, Lieut. Col. William E. Pearson. The Chief Executive Officer is Colonel Milton E. Davis, who was Chief of Training under the Kenly regime, and the heads of the four departments are related in the new organization as assistant executives; they are numbered, first, second, third, and fourth, in the order given above, but this does not indicate any difference in standing or precedence in the organization, but is to distinguish them.

The four departments stand on an equal footing in their relation to the Director of Air Service, but that of training and operations, with Brig. Gen. Mitchell in charge, is the largest as it is the main successor to the Division of Military Aeronautics, over which Major Gen. Kenly formerly presided. The names of the chiefs of the two branches of the old organization, "Director of Air Production" and "Director of Military Aeronautics," will be kept alive only until contracts existing in these names are disposed of. Whatever future expansion the Air Service may have the new organization the result of careful study of every feature of the situation, offers a framework of which that expansion may take advantage.

Casualties in the U. S. A. S. Abroad

Casualties in the United States Air Service personnel serving with the American and Allied armies at the front numbered 554. Of the total 171 men were killed in combat.

A table made public by the War Department gives the following official casualty report for the Air Service at the front:

Killed in combat, 171; prisoners, 135; wounded, 129; missing, 73; killed in accidents, 42; other causes, 4.

The record by months shows the rapid rise in casualties as American flyers began to get into action. It follows:

March 1918, 2; April, none; May, 27; June, 29; July, 65; August, 82; September, 181; October, 125; November to November 11, 43.

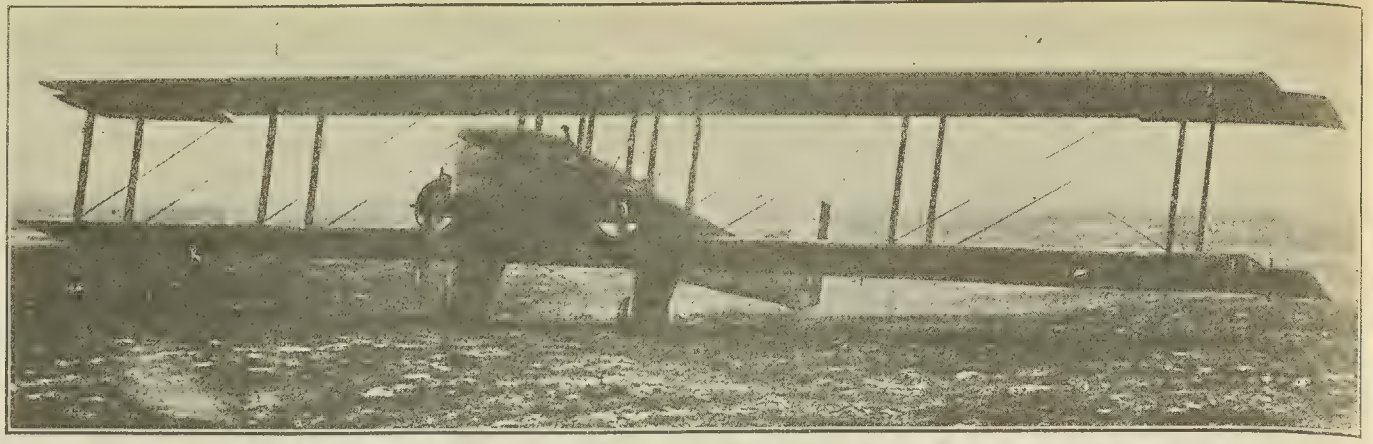
New Motor Fuel Aids Speed of Airplanes

Development too late for use in the war of a motor fuel which adds ten miles an hour to the speed of airplanes and has possibilities for use in automobile racing was announced March 22 by the Bureau of Mines. The liquid, a combination of benzol and cyclohexane called hectar, costs about $1 a gallon, so while of military value it is not regarded as practical for commercial purposes at present.

Another combination of benzol and gasolene has been found to be more powerful than gasolene alone, and is expected to prove of value in industry.

Secy. Baker's Son Likes to Fly

Newton D. Baker, Jr., son of the Secretary of War, celebrated his twelfth birthday on March 21 by taking a flight as a passenger in an army airplane over Washington. Lieutenant Leo F. Post, army aviator stationed at Bolling Field, took young Baker up in an hour's flight in which he circled the Capital, and showed the delighted youngster the sights of the city from the air. The boy liked it so well that he did not want to come down at all.



The Twin-engined Farman Biplane which is being used to carry official communications for the French and British Governments between London and Paris

COST ANALYSIS OF AIRPLANE OPERATION

Figures Furnished by the Apache Aerial Transportation Co.

OVER CALIFORNIA ROUTES

Based on the Cost of Operating Three Glenn L. Martin Twin-Motored Passenger Machines

One of the first complete estimates regarding the cost of aerial transportation has been given out in the form of a prospectus by the Apache Aerial Transportation Co. It is based on the cost of operating three Martin twin-motored passenger machines.

Cost Analysis

Cost analysis of air transportation service between Los Angeles and San Diego, California, and between Los Angeles and Riverside, California, in consideration of three Martin 12-passenger planes in service, two on former and one on latter line, operating on following schedule:

Los Angeles-San Diego

Leave Los Angeles	Arrive San Diego
8:00 A. M.	9:30 A. M.
10:30 A. M.	12:00 Noon
1:00 A. M.	2:30 P. M.
3:30 P. M.	5:00 P. M.
5:30 P. M.	7:00 P. M.

San Diego-Los Angeles

Leave San Diego	Arrive Los Angeles
8:00 A. M.	9:30 A. M.
10:30 A. M.	12:00 Noon
1:00 A. M.	2:30 P. M.
3:30 P. M.	5:00 P. M.
5:30 P. M.	7:00 P. M.

Los Angeles-Riverside

Leave Los Angeles	Arrive Riverside
8:00 A. M.	8:30 A. M.
10:00 A. M.	10:30 A. M.
12:00 Noon	12:30 P. M.
2:00 P. M.	2:30 P. M.
4:00 P. M.	4:30 P. M.
6:00 P. M.	6:30 P. M.

Riverside-Los Angeles

Leave Riverside	Arrive Los Angeles
8:45 A. M.	9:15 A. M.
10:45 A. M.	11:15 A. M,
12:45 P. M.	1:15 P. M.
2:45 P. M.	3:15 P. M.
4:45 P. M.	5:15 P. M.
6:45 P. M.	7:15 P. M.

The above schedules are based on the following conditions:

Speed of planes, 120 m.p.h., always encountering a 20 m.p.h. head-wind, and with motors throttled 10 m.p.h., which results in assuming an average speed of 90 m.p.h.

From this it can be seen that it is reasonable to expect schedules will be maintained at all times when not encountering a head wind of greater velocity than 30 m.p.h.

Investment and Operation Expenses

Hangars and Repair Shops, 4 hangars of 4,000 sq. ft. each	$20,000
Machine Tool and Hangar Equipment	10,000
Office Equipment	1,000
Gasoline Tankage Equipment	3,000
4 Busses, at $2,000	8,000
Total Property Equipment, Investment	$42,000

Transportation Equipment Per Year

6 Airplanes, without engines, at $36,600 each	$219,600
24 Engines at $4,200 each	100,800
Airplane Spares (equal to 20 per cent of plane)	43,920
Engine Spares (equal to 50 per cent of engines)	50,400
Material	2,000
Total Transportation Equipment per Year	$416,720

Direct Operating Costs Per Year

Gasoline for Planes—328,500 gals. at 25c.	$82,125
Oil for Planes—19,710 gals. at 75c.	14,782
Gasoline for Busses—14,600 gals. at 20c.	2,920
Oil for Busses—350 Gals. at 75c.	262
Parts and Tires for Busses	5,000
Total Materials	$105,089

Operating Personnel Per Year

1 Chief Pilot	$5,000
5 Pilots—at $4,500	22,500
1 Shop Superintendent	3,000
2 Flying Mechanics—$2,500	5,000
2 Shop Foremen—at $1,800	3,600
1 Draftsman	1,500
18 Mechanics—at $1,500	27,000
2 Watchmen—at $1,300	2,600
3 Stenographers—at $1,300	3,900
4 Bus Drivers—at $1,500	6,000
Total Operating Personnel	$80,100

Overhead Operating Cost Per Year

ADMINISTRATIVE SALARIES

1 General Manager	$7,000
1 Accountant	3,000
2 Stenographers	2,600
Total Administrative Salaries	$12,600

OVERHEAD

Field and Building Upkeep	$3,000
Fire Insurance on Buildings and Equipment	400
Taxes	4,000
Heat, Light and Power	1,200
Office Rent	1,500
Office Supplies	500
Postage, Telegraph and Telephone	2,500
Depreciation—	
Buildings at 5%	1,000
Mach. Tool and Factory Equipment at 10%	1,000
Office Equipment at 10%	100
Gasoline Storage Tank Equipment at 10%	300
Busses at 25%	2,000
Overhead	$17,500

Total Cost of Operation Per Year

Transportation Equipment	$416,720
Materials	105,089
Operating Salaries	80,100
Administrative Salaries	12,600
Overhead	17,500
Reserve for Unforeseen Expenses	20,000
Total Operating Expenses for Year	$652,009
Passengers carried per year, between Los Angeles and San Diego at 75% capacity	27,375
At 120 miles per trip—man miles	3,285,000
Passengers carried per year between Los Angeles and Riverside at 75% capacity	32,850
At 50 miles per trip—man miles	1,642,500
Total man miles per year on both lines	4,927,500
Total cost of transportation per man per mile	.132
Cost per passenger, Los Angeles to San Diego or vice versa	15.84
Cost per passenger, Los Angeles to Riverside or vice versa	6.60

Total Investment Required

Transportation Equipment for 6 mo.	$208,360
Buildings	20,000
Machine Tool and Factory Equip.	10,000
Office Equipment	1,000
Gasoline Storage Tank Equipment	3,000
Busses	8,000
Working Capital Required (Estimating 12 turnovers per year)	54,333
Total Investment Required	$305,693

March Winds Help Airplane Speed Record

Favorable March winds have helped airplane speed records between Washington and New York in the past several days. D. H. DeHart, pilot, brought in the air mail from New York March 19 in 2 hours and 14 minutes after a checkered trip at different altitudes to dodge bad winds and patches of rain and snow which lay in his course.

He covered the stretch from New York to Philadelphia at the rate of 110 miles an hour and from Philadelphia to Washington at 90⅓ miles an hour with a full load of mail.

On March 11, Aviator E. H. Lee brought the mail into Washington from New York at better than 100 miles an hour, flying from New York to Philadelphia at the rate of 102 miles an hour and from Philadelphia to Washington at the rate of 101 miles an hour. The total elapsed time of the trip was 2 hours and 8 minutes with a mail load.

On March 12, Aviator Leon H. Smith brought the mail to Washington in 2 hours and 7 minutes flying, covering the distance between New York and Philadelphia at the rate of 98 miles an hour and between Philadelphia and Washington at the rate of 110 miles an hour.

On March 15, Aviator Ira O. Biffle made a remarkable trip through rain and fog from New York to Washington, carrying the mail on that day between the two points in 2 hours and 7 minutes. The trip from New York to Philadelphia was made at the rate of 90 miles in 48 minutes, or at the rate of 112 miles an hour, and from Philadelphia to Washington in 1 hour 19 minutes, or at the rate of 97 miles an hour, bringing in a load of 281 pounds of mail. Going against the storm on last Saturday from Washington to New York the speed of the mail plane was held down to an average of 51 miles an hour.

On Monday, March 17, Aviator E. V. Gardner flew from Washington to New York with the mail in 2 hours 5 minutes, covering the run from Washington to Philadelphia at the rate of 98.4 miles an hour and from Philadelphia to New York at the rate of 114 miles an hour. The trip from New York to Washington against the strong headwind was at the rate of 57 miles an hour.

District Supervisors

The offices of District Supervisors of Air Service activities in the following named districts have been ordered abolished, effective March 31, 1919:

Eastern District—Headquarters, O. D. M. A., Executive Section, Supervisors Branch.

Southeastern District—Headquarters, Montgomery, Ala.

Northern District—Headquarters, Indianapolis, Ind.

Southern District — Headquarters, Houston, Texas.

Southwestern District—Headquarters, Dallas, Texas.

Western District—Headquarters, Coronado, California.

The functions heretofore performed by District Supervisors will, in the future, be exercised by the office of the Director of Air Service, and by Department Air Service officers in accordance with definite instructions to be promulgated later.

Aeronautics at the C. C. N. Y.

Several courses in practical and theoretical aeronautics are being given in the College of the City of New York, 140th street and Amsterdam avenue. These courses are arranged to prepare men for the ground schools of aviation, for mechanical jobs with the aircraft and motor companies, for positions as draftsmen, designers and aeronautical engineers. They are preparatory courses for the regular college courses for degrees as aeronautical mechanical engineer. Prof. Harry J. Marx is in charge of Aeronautics.

Thomas-Morse Planes in Flight to Ithaca

A Thomas-Morse biplane, piloted by "Tex" Marshall and carrying a reporter for the New York *Sun* as passenger, reached Ithaca late last Thursday afternoon after covering 200 miles from Hazelhurst Field, Mineola, in 150 minutes.

The trip was made on the direct line to Ithaca, the pilot steering a course above the rough country of northern New Jersey, where the only possible landing place in case of emergency would have been a lake or river. For this reason airplanes generally keep clear of this section, and the flight completed last Thursday is said to have been the first ever made between New York and Ithaca

Two Thomas-Morse planes, each equipped with a Lerhone rotary motor of 80 h.p., left Mineola at 3:15 in the afternoon. After circling to a height of 2,000 feet both planes, the second piloted by Paul Wilson and carrying as a passenger a reporter for the New York *Times*, crossed the Sound, continuing to rise as the Hudson was passed and the Jersey plain reached. A wind from the northwest with a velocity of forty miles made it necessary to head the machines almost due north to overcome the drift.

At Port Jervis, one hour after the start, the planes were still rising, and a little later the highest altitude of the trip, a little over 8,000 feet, was attained. The second plane was compelled to descend at Binghamton owing to lack of gasolene.

Discharges for A. S. Officers

The following officers are honorably discharged from the Service of the United States:

Howard W. Heintz, Second Lieut., A. S. A.; Leon Richardson, Captain, A. S. A.; George Perkins, First Lieut., A. S. A.; William H. Vollmer, First Lieut., A. S. A.; Charles H. Shook, First Lieut., A. S. A.; Clarence A. Smith, Second Lieut., A. S. M. A.; David S. Johnson, First Lieut., A. S. A.; Frank A. Pence, First Lieut., A. S. A.; Benjamin F. Fiery, Second Lieut., A. S. A.; Elias H. Kron, First Lieut., A. S. M. A.; Edward D. Babcock, First Lieut., A. S. A.; Emil F. Schwab, First Lieut., A. S. A., and Percy H. Willis, First Lieut., A. S. A.

Foreign Chevrons and Badges

Officers and enlisted men of the United States Army who served in the armies of any cobelligerent with the United States in the present war, are authorized by an order of the Secretary of War, to wear such chevrons or badges as may have been awarded to them by the governments in whose armies they served.

MAKING RULES OF THE AIR IN PARIS

Inter-Allied Commission Sub-Committee Hard at Work

PILOT'S QUALIFICATIONS

Airplanes Probably Will Have to Obey Regulations Similar to Those Which Govern Shipping

The sub-commissions appointed by the Interallied Commission continue examing with the greatest care various questions within their respective spheres. Although no definite decisions can be said to have been reached, it appears probable that all air vessels will have to obey rules similar to those laid down for maritime shipping.

Passing on the right hand will be a universal rule. At night machines will be compelled to carry front, rear and side lights. Aerial "roads" will come into use in much the same way as did land roads, merely from custom. Various routes naturally have been formed by past flying, and others will follow gradually. As soon as a certain route is seen by the authorities to be frequented landing stages, guiding lights at night and visible signs for the day will be established.

The commission also is considering what qualifications will be necessary before a driving license for personal conveyance and for carrying paying passengers will be granted. The pilot's certificate has been of varying standard in the past. This is to be changed. It is probable flying tests in the future will be more difficult than they were for war pilots, and it may be that two certificates will be authorized, first that of an apprentice allowing the holder to fly within a restricted area, and then the certificate of a finished pilot.

Medical Tests for Pilots

A standard medical certificate will also have to be possessed by a pilot. In the past health qualifications varied with the climatic conditions of the country in which the flying was to be done; the new health test will quailfy the pilot for flying the world over.

The British proposal in regard to frontier control seems to find general favor. The French, however, to save time in the new organization, appear to have decided to adopt the D. C. A. (defense centre avions) system, which was used during the war. It is certain it will be an international agreement that all planes passing a frontier will be obliged to land in specified airdromes on the frontier line to have papers and cargoes examined.

The commission seems still in difficulty in regard to flying regulations to be imposed on enemy countries. It is very difficult to be sure that peace time planes will not be able to be transformed in a short space of time into war machines. Yet it is rather hard to guarantee that if flying is prohibited there the order will be obeyed.

The possible outcome is that the Allies will take a longer lease on all commercial aerial lines in Germany. That would prevent the growth of flying on a large scale for a certain period. Such an agreement would necessarily have to be a clause in the peace treaty.

Enforcing Terms on Foe

For the execution of various military, naval and air terms outlined in these despatches Thursday's time limit will be controlled by specially appointed interallied commissions of control. Those commissions will be entrusted with the duty of supervising the strict execution of all destructions of material to be carried out at the expense of the German Government and will communicate to the German authorities the decisions which the allied Governments have reserved the right to take or which execution of military, naval or air terms may necessitate.

These commissions of control will be entitled to establish their headquarters at the seat of the German Government and appoint any number of sub-commissions, which, together with members of the main commission, will have the right to travel anywhere in Germany on their mission.

The German Government will be asked to attach duly qualified representatives to act as liaison between the various interallied commissions and the German Government. An interesting provision is included which lays down that Germany must at her own cost furnish all the labor and material to be used in delivering and destroying war material, as well as the fortifications.

Capt. Chas. J. Glidden

One of the most interesting figures in the Air Service is Captain Glidden whose sportsmanship in the automobile world is known generally.

He was born in Lowell, Mass., August 29, 1857, and educated in the public schools of Lowell. In 1872 he was messenger for the Northern Telegraph Co. at Lowell, and later became manager Atlantic and Pacific Telegraph Company at Manchester, N. H., and correspondent of the Boston *Globe*, *Transcript* and *Traveler*. He conducted telephone experiments in May, 1877 with Prof. A. Graham Bell in a test, Manchester, N. H. to Boston, Mass., 57 miles, and later built private telephone lines in New England cities. He suggested to the Bell Company the idea of constructing a general telephone exchange system which they agreed to do if 50 subscribers at $1.50 per month each were obtained at Lowell. Commenced canvassing in the Fall of 1877 and obtained first telephone subscriber to a telephone exchange in the world. In 1879 he built the first long distance telephone line in the world from Lowell to Boston. From 1878 to 1900 he organized and served as secretary, treasurer and president of several New England and western telephone companies under the Bell system—employing fifty million capital, at one time.

He retired from active business in 1900 but became interested in the development of the automobile and aerial navigation, personally driving the automobile 100,000 miles in 39 countries of the world, taking the car first around the world twice, East and West, devoting all the time from 1901 to 1908 to automobiling. Crossed the Arctic Circle in Sweden and reached Ward's Parade in New Zealand, the extreme northerly and southerly points possible to drive with the automobile.

Captain Glidden has to date made 50 balloon ascensions: 3 in France, 4 in England, 42 in the United States and 1 in the observation balloon at Fort Omaha.

He was commissioned 1st Lieutenant, A. S. S. O. R. C., June 12, 1917, and was assigned to active duty at U. S. Army Balloon School, Ft. Omaha, Neb. Later became Aeronautical Officer, Northeastern Department, stationed at Boston. Procured and passed 6,000 applicants for commissions as aviators and balloon pilots. Promoted to Captaincy, Feb 20, 1918. Took up duties as Personnel Adjutant and acted as such at Ft. Omaha and Souther Field, Americus, Ga., where he is at present stationed.

Peru Plans for An Air Service

It is reported that the Peruvian Congress has passed a bill for the establishment of an aerial training center, probably to be located near Bogota City. The aviation center will be equipped with the most modern appliances, including airplanes of the most modern description and variety, camera guns, navigational devices, etc.

It is reported that its management will be given to some foreign military instructors, but no hint is available as to the nation. It is also believed that it will seek to develop commercial machines.

MR. WILSON HAS PLANS FOR AIR REGULATION

Furnished by the National Advisory Committee for Aeronautics

LEGISLATION TO BE ASKED

Memorandum Giving Reasons for the Establishment of Rules for Aerial Navigation in the U. S.

Memoranda and recommendations for aerial navigation regulations, drawn up by the National Advisory Committee for Aeronautics, approved by the Secretaries of the Navy, Commerce and War, were sent to the President recently.

The details, released by Dr. Charles D. Walcott, of the National Advisory Committee for Aeronautics, in the form of a proposed Congressional bill, are as follows:

That no person, company or corporation within the jurisdiction of the United States and its dependencies, other than duly accredited officers and enlisted men of the Army, Navy and Marine Corps, shall use or operate any aircraft in aerial navigation from one State or Territory of the United States or the District of Columbia, to any other State or Territory of the United States or the District of Columbia, or from one place in a State or Territory or the District of Columbia, to another place in the same State or Territory or the District of Columbia, or between the United States or its dependencies and any foreign country or any international waters, except under and in accordance with a license, revocable for cause, granted by the Secretary of Commerce upon application therefor; and the Secretary of Commerce is hereby authorized to grant such licenses and to make and publish all needful rules and regulations for the licensing and navigation of such aircraft; any violation of such rules or regulations to be punished by a fine not to exceed $500.00; and the Secretary of Commerce shall submit, by Dec. 10, 1919, a report to Congress, giving in detail the action taken by him hereunder, together with his recommendations for further and more detailed legislation with respect to the navigation of aircraft and the licensing and regulation thereof. For the enforcement of this Act and the rules and regulations made in pursuance thereof, including personal services in the District of Columbia and in the Field, the sum of $25,000.00 is hereby appropriated.

MEMORANDUM

An emergency has arisen in relation to the establishment of rules and regulations to govern aerial navigation within the United States and its dependencies.

1. At the present time there is no authority for the establishment of rules and regulations to govern civil aerial navigation in the United States and its dependencies except local laws passed prior to 1914 in the States of Massachusetts and Connecticut.

2. The War Department alone now has for sale several thousand aircraft of various types which, if put upon the market, will be purchased largely by amateurs, and in the absence of Government rules and regulations it is highly probable that many accidents will occur and much litigation ensue.

3. There is also a probability of complications, especially in matters of smuggling, arising by unlicensed irresponsible aircraft crossing the borders between the United States and both Canada and Mexico.

4. At the present time the Joint Army and Navy Board of Aeronautical Cognizance is issuing licenses to pilots as a war emergency, but without assuming any responsibility as to qualifications of pilots or air worthiness of the airplanes.

Details of the British London-New York Airship Transport Project

A document of great interest, in its bearing on airship transport services, has been prepared by Vicker's, Ltd., of Barrow-in-Furness, England, who designed and constructed the first rigid airships for service with the British Navy. This memorandum sets out to show the advantages of the airship over the airplane for non-stop voyages of long duration, and to establish the claim that "the airship will hold the field for long distance cross-oceanic air voyages,"

London to New York

To begin with, London to New York is suggested as the best route for the first service. This is the route on which the greatest demand would arise for a saving in the duration of the voyage, and a large amount of passenger traffic would be immediately available once the advantages of the service were demonstrated. The general specification of the proposed airship for transport services is as follows.

Gross gas capacity	3,500,000 cubic ft.
Overall length	800 ft.
Maximum diameter and overall width	100 ft.
Overall height	105 ft.
Total lift (at 68 lb. per 1,000 cu. ft.)	105 tons
Disposable lift	68 tons
Total maximum power of engines	3,500 b.h.p.
Cruising power	2,000 b.h.p.
Speed at full power	75 m.h.p.
Speed at cruising power	60 m.p.h.
Endurance at cruising power:	
When carrying 15 tons of passengers and freight	80 hours 4,800 miles
When carrying 10 tons of passengers and freight	90 hours 5,400 miles

The "disposable lift" is the lift available for fuel and oil, stores, crew and passengers, mails, and freight, etc. The particulars and performances stated are based on present design, and the actual performance of ships of 2,000,000 cu. ft. capacity now in service. It is considered that the figures given are conservative, and that actually the increased size of ship would enable greater structural efficiency, and, consequently, greater disposable lift available than that specified.

The main living accommodation would be in a saloon fitted along the top of the airship, provided with tables and chairs in the style of a Pullman car, which would enable the passengers to be comfortably accommodated during the daytime. Part of this saloon would be fireproofed to allow of being used as a smokeroom. An open shelter deck would also be provided with windows, giving the passengers an all-round outlook.

A passenger lift would be provided for communication between passengers' quarters and the lower part of the ship. An observation car, fitted below the hull towards the aft end of the airship would also enable passengers to observe the land and sea immediately below the ship. Sleeping accommodation in the form of berths would be provided in small cabins fitted on top of the airship forward of the living saloons. A mess kitchen would be provided fitted with electrical cooking apparatus. Meals would be served in the saloon. The saloons and sleeping quarters would be heated by electric radiators.

Height Equilibrium

On long day and night flights the greatest problem is the maintenance of the airship at a constant height, and avoiding the loss of gas consequent on expansion due to the ship rising as she loses weight by the consumption of engine fuel. Also, owing to the great variation in temperature between day and night, the ship becomes heavy, due to the lower temperature at night, and light, due to the higher day temperature; and thus would require a discharge of weight (ballast) at nightfall and discharge of gas in the morning to keep the ship in equilibrium. To obviate discharge of gas, and the necessity of starting with a large weight of ballast, it is proposed to adopt the following means:

(1) Using hydrogen as fuel arrangements might be made to run a proportion of the engines on gas fuel, so the gas can be consumed at such a rate that the loss of lift equals the loss of weight of fuel consumed by the other engines, thus economically using gas which otherwise would be lost through the discharge of the gas-valves.

(2) Water recovery from exhaust gases. Apparatus could be provided to condense the water of combustion from the exhaust gases of the engines. Experiments which have been carried out have demonstrated that it is practicable to recover water of slightly greater weight than the gasoline consumed, thus avoiding any variation in lift due to gasoline consumption.

(3) Water ballast from the sea. Apparatus could be provided to enable water ballast to be picked up periodically from the sea by means of a pump suspended from a flexible hose, or by bringing the airship down on the water's surface and taking water direct into tanks in the gondolas through sea-valves.

(4) If the airship is flown with a slight upwards or downwards inclination, a considerable lifting or weight effect is obtained, but this, however, entails a reduction in the flying speed of the ship.

General Specifications

Hull Structure—The shape of the hull to be of the most perfect stream-line form within the limitations of constructional requirements. An internal keel corridor, running along the bottom of the hull, is to be provided, in which all gasoline and oil tanks and water ballast would be carried.

Outer Covering—The outer cover would be made of special weather-proof fabric, to give the longest possible life when subjected to the weather effects on continuous voyages. Also, to be as efficient as possible in insulating the gas from change of temperature, and so avoid great variations in the lift.

Gasbags—The gas capacity would be divided up into gasbags made of suitable rubber-proofed cotton fabric, lined with goldbeater's skins. Gasbags will be fitted to automatic relief valves and hand control manoeuvring valves.

Control and Navigating Compartment—A control and navigating compartment to be built on to the hull towards the forward end of the airship, which would contain all main controls, the navigating instruments, and also the wireless telegraphy installation cabin. This compartment should be so arranged with windows as to have a clear view in every direction.

Machinery Cars—Six machinery cars would be fitted, each containing one engine installation, with a direct-driven propeller fitted at the aft end. Two of these cars to be suspended on each side of the hull, suitably arranged so as to give ample ground clearance for the propellers. The two other cars to be situated underneath the hull, and fitted with landing gear and floats.

Machinery Arrangements

Six engines, of a nominal 600 b.h.p. each, to be fitted, making a maximum total power of 3,500 b.h.p. The engines to be designed to develop their maximum full power when flying at a height of 5,000 ft. Starting to be by the Maybach charging pump system, or alternatively, the engines to be arranged to start on the hydrogen fuel. The transmission gear in two of the wing cars only to be fitted with reversing gear to enable the airship to be driven astern.

Cooling System—The radiators of the engine coling system to be fitted in slides to enable them to be completely drawn into the cars when the engines are not running, to ensure their being kept sufficiently warm and prevent freezing.

Silencer—The engines are to be fitted with special exhaust silencers in order to reduce the exhaust noise to a minimum, and special consideration is also to be given in the design of the transmission gear, etc., to obviate as far as possible all objectionable noise.

Engine Fuel—All engines to be designed for running on gasoline fuel, but to be fitted with arrangements to enable them to be run alternatively on hydrogen gas.

Controls and Communications—All the following controls of improved type would be fitted, to be operated from the forward control compartment:

(1) Control to the rudders and elevator planes for the steering control.

(2) Control gear to be fitted to enable the gas discharge valves on a selected number of gasbags to be operated from the control compartment.

(3) Controls would be fitted to enable all the emergency water ballast discharge to be controlled from the forward compartment, all other water ballast to be discharged by local control.

(4) Engine room telegraphs, preferably of the electrical type, would be fitted for communication from the forward compartment of the machinery cars.

(5) Telephone communication would be provided between all stations on the ship.

Heating Arrangements—The living quarters and the control compartment would be heated by electric radiators.

In the machinery cars, arrangements would be made to utilize the exhaust heat for keeping the cars at the necessary temperature.

Landing Gear—Inflated buffer landing bags of a special type would be fitted underneath the forward control compartment, and underneath the two aft machinery cars, which would enable the airship to alight either on land or on the surface of the sea.

Mooring and Handling Gear—Hauling-down ropes, mooring ropes, and sea anchor gear, would be provided as necessary in connection with the mechanical handling and mooring out arrangements. The airship would be provided with bow mooring gear to enable her to be moored out to the mooring tower. Special means of mechanically handling the airship when landing, and for taking her into the shed, are to be provided on the landing grounds, and the necessary attachments in connection with this provided on the ship.

Electrical Installation — Electrical power would be provided by dynamos driven off the main engines to provide current for electric lighting of the saloons and cars, and also to provide the electrical heating in the saloon cabin and sleeping quarters.

Wireless Telegraphy — A powerful wireless telegraphy installation would be fitted in the wireless cabin in the forward control compartment, and would have a range for sending and receiving of at least 5,000 miles.

Routes and Services

Prevailing wind on the direct route (London to New York) is almost always from west to east, which would, of course, always favor the east-bound journey, but is unfavorable to the west-bound journey. It is proposed, therefore, that the crossing eastward from New York to London should be made by the most direct route, and thus take advantage of the westerly winds. The distance direct by this route is 3,000 miles.

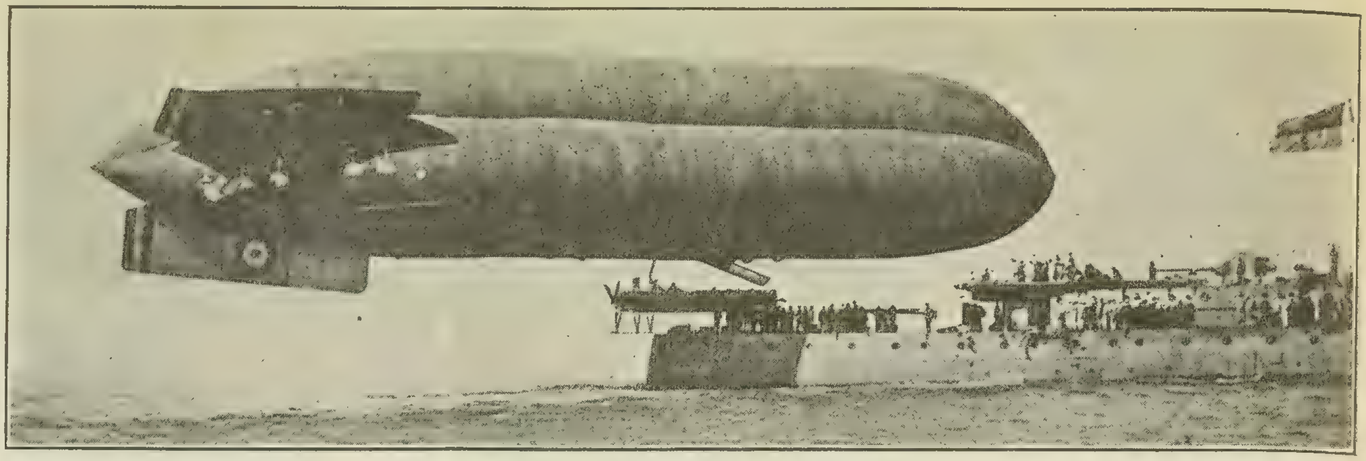
By making the west-bound journey by a southerly route, via the coast of Portugal (Azores) and on 35 deg. N. parallel of latitude across the Atlantic, and then to New York, the voyage is made in a region where the prevailing westerly winds of the higher latitudes are absent, and only light winds are encountered, which are generally of a favorable direction. The distance by this route, however, is about 3,600 miles, but with a ship speed of 60 m.p.h., if the wind was greater than this, it would be quicker to go west by the southerly route via Azores.

The distances and normal times for the N. journey would therefore be as follows:

London to New York, via Portugal and the Azores, 3,600 miles; time taken, 60 hours, or two and a half days.

New York to London by the direct route, 3,000 miles; time taken, 50 hours, or just over two days.

It is proposed to have four airships for use on the cross-Atlantic service. Two airships would only be in service at a time, and the other two standing by, so that each airship could lay up alternate weeks for overhaul and refit, etc. As the time of journey between London and New York will vary between 50 to 60 hours, each airship will therefore easily make two crossings or



British Coast Patrol Airship Alighting on a Battleship

(C) *Keystone View Co.*

one double journey per week, thus giving a service with two airships of two "sailing" each way per week. The average time-table might therefore be as follows:

LEAVE LONDON	LEAVE NEW YORK
Monday, A. M.	Monday, P. M.
Thursday, A. M.	Thursday, P. M.
ARRIVE NEW YORK	ARRIVE LONDON
Wednesday, P. M.	Thursday, A. M.
Saturday, P. M.	Sunday, A. M.

From available weather records it is considered that crossings would be practicable on at least 300 days in the year, or 82 per cent of the total days, so that it is probable that a total of 200 crossings in the year could be maintained. It is probable that until weather conditions have been further studied so that advantage can be taken of the best possible routes, that a regular service of two crossings each way per week could probably only be maintained at first in the months of May to September, and that the crossings in October to April would probably be irregular, the actual day of sailing being dependent on the weather conditions.

The total crew carried would be nineteen men, with a total weight of 3,600 lb., at 190 lb. per man, and the disposable weight for the journey would be 68 tons. The 15 tons allocated to passengers and mails would carry 140 passengers and effects or 10 tons of mail and 50 passengers. The total capital required is £2,600,000 ($13,000,000). The charge per passenger would be £45 ($225) per head London to New York, which is equivalent to 4d. (8 cents) per mile per passenger. The rate for mails would be £425 ($2,125) per ton or 3d. (6 cents) per ounce.

Government Subsidy

It is considered possible that proposals for Government support for the establishment of airship services would be favorably considered, as the constant use of airships for commercial work would be the best possible means of developing and improving the design, as suggested by the constant experience obtained in service. It would offer a means of keeping in constant training officers and crews, who would be available for naval service.

The type of airships used for passenger and mail transport could also be very well adapted for use in the naval services should occasion require. From the analysis of working cost, it is inferred that airship services, when fully established and patronized, will be able to show a good working profit. It would probably require considerable financial support before the service will be so established as to ensure full support from passenger and mail traffic, when it should be able to be run on a paying basis.

To establish and work trans-oceanic airship lines, it is proposed to form a joint syndicate with a shipping company (e.g., the Cunard Line), who would undertake the organization of the operation of the service and the necessary publicity; Vickers, Ltd., to build the necessary airships and provide necessary technical staff and facilities for maintenance.

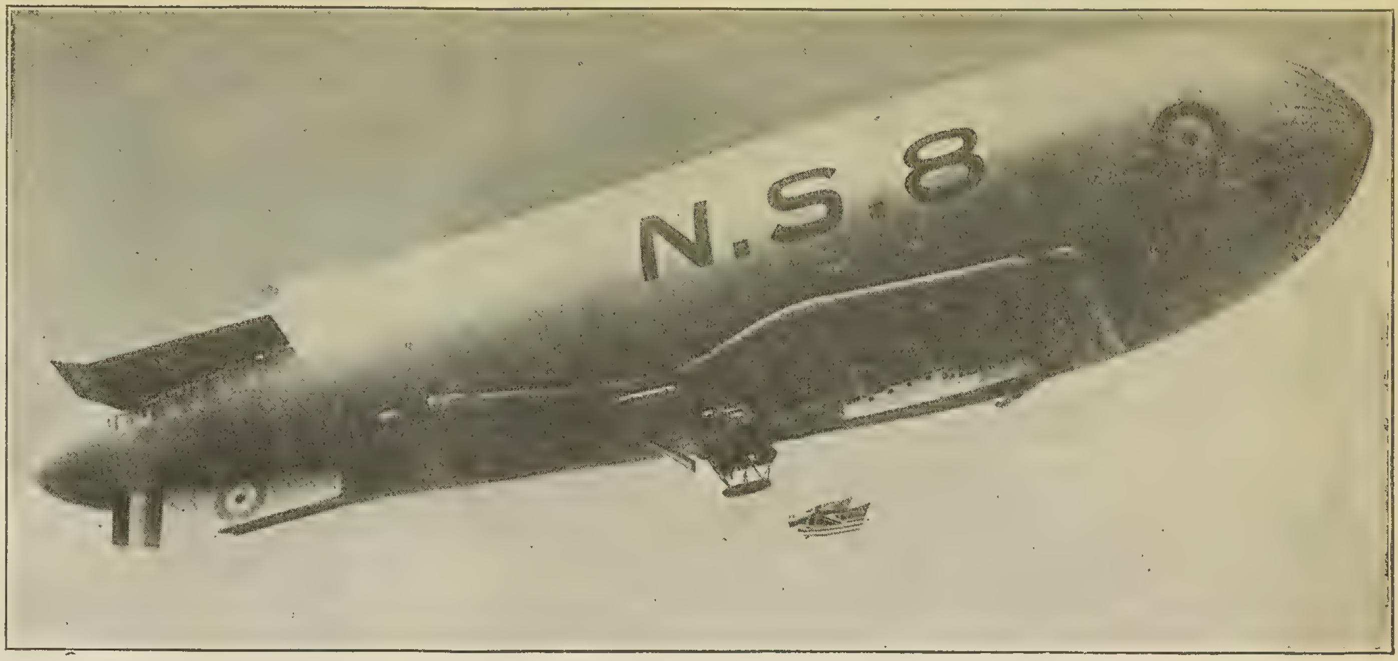
The Government subsidy to the airship companies would probably be on the following terms:

(1) Loan of airship sheds and flying grounds by the Government, free of charge, until the experimental stage is passed, and the company in a position to obtain the necesary capital for providing the requisite sheds and landing grounds for new services.

(2) The loan of naval airship crews and handling parties, until the service was establishted as a paying concern, and until officers and crews could be trained by the airship company.

(3) The Government to pay a substantial subsidy for the conveyance of express mails.

(4) It is also possible that the Government would be prepared to share or undertake all the financial risk of the insurance of the airships until the security of the service was so established as to warrant underwriters giving reasonable rates.



British Naval Airship of the North Sea (N. S.) Class

Britain's Try May Come Next Week

(Continued from Page 1)

six cylinders, so there is a double spark for each cylinder. Harry G. Hawker has been nominated as pilot and Lieutenant Commander Mackenzie Grieve, R. N., as navigator.

It was announced that the start would be made at the earliest possible moment from St. Johns. By arangement with the Air Ministry, Major A. Partridge, R. A. F., will act as official starter.

Talks of 19½ Hours

Before he left England Mr. Hawker said he believed the flight would require about nineteen and one-half hours, and that the machine was capable of remaining in flight about twenty-five hours at a rate of 100 miles an hour. He said it had already flown 900 miles in 9 hours and 5 minutes on one-third of the petrol in its tanks, and this was half the distance between Newfoundland and Ireland.

Hawker an Australian

Harry G. Hawker won the British Michelin Prize for 1912 by a flight of 8 hours and 23 minutes. He has made many long-distance flights along the British Coast. He established an altitude record of 28,500 feet in 1916, a world record at that time, but since beaten by Major R. W. Schroeder's record of 28,900 feet. It is claimed that recently Hawker has eclipsed Major Schroeder's record, but a rereading of the instruments, it is thought, will fail to substantiate the claim.

Hawker is an Australian, who came to England in the early days of flying to learn. He took his pilot's certificate, and is now one of the best test pilots in the world, holding several British records. He got furthest on the *Daily Mail* circuit in Great Britain, a competition in which an unfortunate acident prevented the completion. Grieve was commander of the seaplane carrier Campania, and the machine is a biplane, secretly built in a corner of the Sopwith plant. It has a Rolls-Royce 360-hp. motor and a petrol supply for twenty-four hours. The pilot and navigator sit side by side, which is a radical departure. It has installed a powerful wireless apparatus. The pilot and navigator wear rubber lifesuits, which would keep them afloat three days. The top decking or back portion of the machine is in boat form attached to the machine by a quick release. The boat contains food and wireless apparatus, and can be released with speed while the machine is still in the air.

Letters Carried for $500

Captain M. Fenn, in charge of the proposed transatlantic flight to be attempted by a Sopwith (British) airplane from Newfoundland to England, has announced at St. John's, Newfoundland, that the flight will be attempted about the first week in April by the Sopwith Aviation Company, Ltd., of Kingston-on-Thames, England, and the airplane will carry mail to a limited extent.

"It is thought that certain American gentlemen may wish to have the honor of being the first to send a letter by Transatlantic Air Post," he says. "We are willing to carry twelve letters, not exceeding 1 oz. per letter, at the rate of $500 a letter.

"The mail bag will be sealed officially at this end and handed over officially on arrival of the machine in England."

Letters for the air post, the Captain says, must reach St. John's not later than April 5. He has selected Mount Pearl, St. John's, as a starting point. The distance to Europe is 1900 miles, nearer than any other point in America.

British Government Entry

The flying boat Porte, which is named after Lieut. Col. John C. Porte, who designed it, was shipped on a vessel across the Atlantic March 20 for the purpose of making from Newfoundland what may be practically described as the official attempt to fly over the Atlantic.

The Porte machine comes from the Government workshop, and will carry the hopes and blessings of the Air Ministry. The Porte is expected to start in about a month and is believed to belong to the type of boats called the "Felixstowe Furies." Lieutenant Colonel Porte would probably have been the first pilot to make a serious attempt to fly across the Atlantic had it not been for the wor. He had been designated as principal pilot of the flying boat America, built by Glenn H. Curtiss for Rodman Wanamaker. The America had reached the point of trial flights at Hammondsport when Porte was called home. At that time he had every confidence that the America would make the trip successfully, and he left with the promise that no one else should attempt the trip in her, pending such time as his Government could spare him.

Another entry for the $50,000 prize offered by the *Daily Mail* for the first flight across the Atlantic was made March 21 in behalf of Major J. C. P. Wood, pilot, and Capt. C. C. Wylie, navigator. They propose to make the attempt in an airplane of 375-hp., capable of a speed of 95 miles an hour when carrying a weight of 2632 lb.

Following successful trials of new British dirigibles of the rigid type, the Government, according to the *Mail*, has ordered the building of two enormous airships.

Fitting NC-1 for Trip Overseas

(Continued from Page 1)

Washington to assist in completing plans for the flight. Commander Bellinger and one of the navy fliers may be selected to pilot the huge craft on the trip to Europe, although the Navy Department has not yet made definite selection of the officers to be used in the flight.

It was pointed out at the Navy Department that the attempted trip to France or England will not be started until every contingency has been carefully looked into and every precaution taken to insure success.

The route, which probably will be from Newfoundland by way of the Azores, will be selected at the last moment to give the navigators the benefit of the best winds and seasonable weather. It was indicated that no public announcement will be made from the Navy Department as to the trial trips of the seaplane or the definite route to be followed to avoid any interruption of plans.

Naval constructors are now engaged in increasing the fuel carrying capacity of the NC-1 so that a sustained flight across the ocean may be made. The big plane, capable of carrying fifty-one passengers, is being remodeled by reducing the passenger carrying space and increasing the tanks for fuel storage. The plan is to use every available foot of space not needed by the crew of five or six men for fuel. The plane on its previous trial trips had a cruising radius of 1,200 miles. Naval authorities hope to increase the fuel capacity to such an extent that an 1,800 miles non-stop trip will be possible.

Air Service Is Reduced 48 Per Cent

The total reduction of commissioned and enlisted strength of the Division of Military Aeronautics, as shown in a compilation of reports made public by the War Department, reached forty-eight per cent on March 6. Since the signing of the armistice the number of cadets has been reduced from 5,775 to 1,285, the number of officers, from 18,688 to 7,078; and the number of enlisted men, from 133,644 to 73,223. The total strength of the division at present is 81,586.

The reduction of personnel of the Bureau of Aircraft Production was 94 per cent. Of a total of 32,520 officers and enlisted men in this branch of the service on November 15, only 2,031 officers and enlisted men remain.

Use of Airplanes by Police Departments

Robert Tamplin, who was returned from Indianapolis, Ind., to Dayton, O., recently by police in an airplane, was given a suspended sentence of $200 and costs and six months in the workhouse when he was arraigned in municipal court Tuesday.

Tamplin was accused of stealing $42 from R. J. Brightman's laundry wagon about ten days ago. A charge of grand larceny was reduced to petit larceny by Prosecutor Chamberlain.

Police Inspector Seymour Yendes and Aviator B. Whelan, of the Dayton-Wright Airplane Co., left Dayton Monday morning at 11 o'clock for Indianapolis. They landed at the Indianapolis speedway track at 11:55. The prisoner was taken to the machine and the return flight started at 3:12. The return trip was made in one hour.

As the machine was not able to carry three persons Inspector Yendes returned to Dayton by train, after seeing his prisoner start on the return trip. The machine was met at the Moraine City field by Officers Joe Wilcox and Frank McGovern, and Tamplin was brought to the city by them.

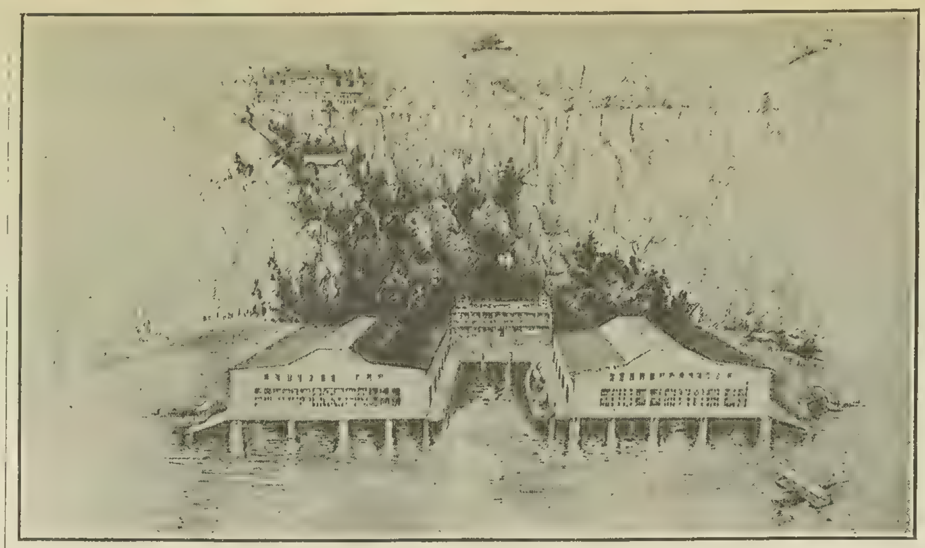
This is the first time in history that the airplane has been used by police in official duty.

Safety Director H. P. James of Dayton announced that arrangements have been completed with the Dayton-Wright Airplane Co. for the use of a machine whenever needed by the department in the pursuit of prisoners or in returning them.

Tamplin willingly accompanied the officers in the machine, and waived extradition papers. Inspector Walter Hughes interceded in his behalf in court, and said that other than his present trouble that Tamplin always bore a good reputation. Tamplin was ordered to report to Inspector Hughes once each week.

Not long ago Safety Director James had occasion to have a conference with the Director of Safety at Toledo, Ohio. The trip was made by airplane, a distance of about one hundred and sixty miles, in one hour and five minutes, and the return trip in one hour and ten minutes. Had this trip been made by train, it would have meant ten hours.

With an airplane equipped with wireless telephone, and with the various towns and cities surrounding Dayton equipped with receiving stations, information concerning serious crimes, automobile thefts, etc., could be very quickly transmitted to these towns.



Air-Yacht Service Station on the Hudson

Since the announcement of the proposed establishment of the air-yacht service station at the Palisades and Fort Washington Point on the Hudson River, Henry Amerman, attorney for the I. M. Uppercu syndicate, has received a proposal from Messrs. Kirby & Smith to erect an incline railway, for the purpose of carrying passengers from the hydro-airplane station up to the top of the Palisades, and the proposal carries with it a stipulation that the fare will not exceed five cents. This would mean an additional convenience for the population in that community that depend upon the Dykeman Street Ferry for transportation to New York, as it would mean a saving of more than two miles, to say nothing of the time.

Senator Henderson Will Learn to Fly

With a United States Senator as the first pupil, a new system of teaching pleasure flying without the months of preliminary ground work and theoretical instruction which have been required of all aspirants for a pilot's license will be tried out at Bolling Field, Washington, D. C., this week.

Senator C. B. Henderson, of Nevada, who recently made several trips in army airplanes from Washington to the Aeronautical Exposition in New York, has become so keenly interested in the flying game that he has decided to learn to operate an airplane.

The system planned is a modification of the successful Gosport system of training that was used in the training of aviators during the war.

Col. W. C. Sherman Chief of Training

Lieut.-Col. Wm. C. Sherman of the Engineers Corps has been detailed as Chief of air service training, which will include heavier-than-air training at both the ground schools and flying fields under Brig. Gen. William Mitchell, Director of Military Aeronautics. Colonel Sherman is a flier and has been connected with the air service for several years.

Announcement of the appointment of Colonel Sherman was contained in a statement by Major Gen. Charles T. Menoher, Director of the Air Service.

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Dreadnaught Safety Suit for Fliers

L. V. Keviczky, the inventor of the Dreadnaught Safety Suit, a man with many years' experience in the steamship business, originally started out to design and perfect a garment that would not only save the wearer from drowning, but that would also exclude water and protect from exposure. Statistics show that many of the survivors of sea disasters succumb from exposure or its after effects. That the inventor has been successful in devising such a garment is clearly shown by the endorsements of the high officials of the International Mercantile Marine Company, U. S. Vol. Life Saving Corps, Masters and Pilots of Steam Vessels, Government Inspectors of Steamships, and other prominent Government and Marine officials.

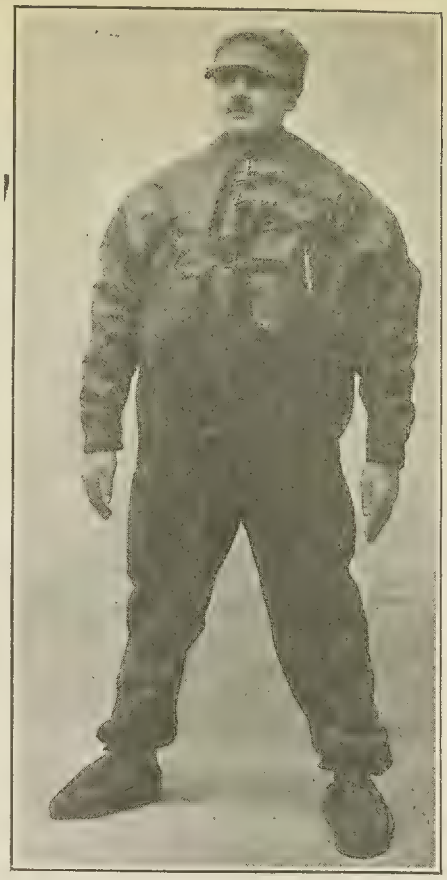
Its value lies in the fact that it keeps the wearer in an upright position, chest high out of water, warm and dry indefinitely, even though in icy water.

It is a one-piece garment of rubberized material, has a simple and effective closure and can be completely adjusted in less than one minute. The buoyancy consists of a silky fibre called Kapok which is padded into a sort of jacket and is buttoned into the suit forming a lining.

The absence of metal parts, clamps, or any mechanical contrivances affords the wearer the same unlimited freedom as if wearing overalls. This fact has made it valuable for many utility and sporting purposes where protection from wet and exposure are required. One of the fields which offer big possibilities for the garment is with naval aviators and their helpers. In order to make the Dreadnaught as efficient and practical for this particular requirement, various details of improvement have been worked out under the personal directions of practical fliers and one of the leading men connected with the Curtiss Engineering Corp. at Garden City, L. I.

One of these improvements constitutes a special designed jacket that enables the aviator, when seated in his plane, to adjust the safety belt about him over the suit with every degree of comfort and security.

Several of the suits are now being used at the Naval Air Station, Pensacola, Fla.



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Details of the A. S. Reorganization

In connection with the reorganization of the Army Air Service, Major General Charles T. Menoher has pointed out that the system of staff organization, used overseas, was followed.

The Director of the Air Service is assisted by an executive officer who is his official mouthpiece, being authorized to sign his name and act as his general executive.

Orders No. 5, issued March 19, 1919, by the Director of Air Service, gives the following detailed information:

1. In naming the various subdivisions of this office, the following terminology will be used:

(a) Headquarters will be known as the Office of the Director of Air Service.

(b) The First, Second, Third and Fourth Assistants will be Chiefs of Groups, known respectively as the Supply, Information, Training and Operations, and Administrative Groups.

(c) The chiefs reporting directly to the Assistant Executives in any group will be known as Chiefs of Divisions.

(d) Those subordinates who report directly to Division Chiefs will be known as Chiefs of Sections.

e) Subordinates reporting directly to Section Chiefs will be known as Branch Chiefs.

Should any further subdivision be required, proper designation of the subdivision so formed will be given upon request to this office.

2. Effective this date, all matters arising in conection with Air Service activities other than that pertaining to cancellation of contracts and that which pertains to the aproval or authority for funds, will be handled through the Executive Assistants and Division Chiefs of this office in the manner contemplated under the organization outlined in Orders Nos. 1 and 2 of this office.

3. Matters pertaining to the cancellation of contracts and the approval or authority for funds will continue to be handled by the Director of Military Aeronautics and the Acting Director of Aircraft Production, as the case may be, and when necessary, will be referred directly to this office for action.

The Chief of Supply Group has charge of supply, airplane engineering, production, procurement, inspection, maintenance and finance disbursement for entire Air Service, in both Aircraft Production and Military Aeronautics.

The Chief of the Information Group gathers and distributes all information, statistics and publicity. In war time he would have charge of intelligence work for the whole Air Service.

The Chief of the Training and Operations Group directs training and operations and is at the same time Director of Military Aeronautics. This is the office held by Brig. General Mitchell.

The Chief of the Administrative Group is practically the Adjutant General of the Air Service, controlling administration, and executive work.

Lt.-Col. Wm. C. Sherman, Corps of Eng., who is a flier and has been connected with the Air Service for some years, has been detailed as chief of Air Service Training, which will include heavier-than-air training at the ground schools and flying fields under General Mitchell.

Record of Causes of Forced Landings

The record of forced landings of Post Office mail airplanes from May 15, 1918, to March 1, 1919, is interesting, as it gives informative data as to the causes of failure to reach the 100 per cent record that must obtain to maintain a successful postal route:

MECHANICAL TROUBLES	
Distributor	1
Magneto	3
Generator	1
Radiator or water trouble	6
Bad valves	2
Gas leak	1
Oil pressure leak	7
Carbureter	1
Foul plugs	6
	28

By analysis of the above mechanical difficulties it has been found possible to instal additional emergency parts which will eliminate nearly all these troubles.

Air Service Officers Change Stations

The following named field officers were ordered to change station March 11, 1919, as follows:

Col. Henry H. Arnold, J. M. A., A. S. A., ordered from Coronado, California, to Rockwell Field, San Diego, California, to assume command.

Col. James E. Fechet, J. M. A., A. S. A., ordered from Houston, Texas, to Kelly Field, San Antonio, Texas, to assume command.

Col. Henry C. Pratt, A. S. A., ordered from Kelly Field, San Antonio, Texas, to Washington, D. C.

Lieut.-Col. Leonard H. Drennan, J. M. A., A. S. A., ordered from Washington, D. C., to Chicago, Ill., for duty as Department Air Service Officer.

Change in Air Service Medical

The Air Service Division of the Office of the Surgeon General, created during the war to handle medical problems connected with the aviation service, was discontinued on March 17th. Business heretofore transacted by this division has been taken over by the Air Service, under the jurisdiction of its chief surgeon.

British Airship Flies 1285 Miles

Official announcement has just been made in London of a remarkable long distance flight performed over the North Sea by the British naval airship N.S.11. The voyage took the form of a circuit, embracing the coast of Denmark, Schleswig-Holstein, Heligoland, North Germany and Holland. The trip was characterized by extremely unfavorable weather and therefore is regarded as ranking as perhaps the most notable flight of the kind ever undertaken.

The total length of the round trip was 1,285 air miles, and the time taken was about forty and a half hours.

The airship started from the Firth of Forth, laying a straight course toward Denmark. There was a northwest wind of fifteen to twenty miles an hour and the night was dark, but the airship was only a mile from her course when she passed the Dogger Bank lighthouse. Then the wind increased and calcium flares were dropped into the sea frequently to determine the location.

The airship's troubles began on the return journey. The wind became stronger and more tempestuous. At midnight one engine became useless and the ship was forced a considerable distance to leeward. The captain contemplated landing in France, but finally decided to hold on in the hope the wind would abate. The wind abating somewhat, a "land fall" was made at North Forel. At this time the gasolene supply was running low and only one engine could be kept running.

The flight was carried out entirely over the sea. It was the longest nonstop overseas voyage ever made by a British aircraft and so far as known it was a world's record for non-rigid airships.

Thomas
THOMAS-MORSE AIRCRAFT CORPORATION
CONTRACTORS TO THE U.S. GOVERNMENT
ITHACA, N.Y. U.S.A.

Souther Field

The importance of suitable landing places for airplanes was fully demonstrated when two high officials of the Air Service, traveling from Montgomery to Atlanta, were obliged to change from their speedy De Havilands to a training Curtiss plane at Souther Field in order to complete the journey. The officers were Col. W. E. Gilmore, Chief of the Supply Division, and Col. C. G. Hall, Chief of Procurement Section. The time made in the De Havilands was seventy minutes for a distance of 146 miles, and at same rate of speed they would have reached Atlanta in less than another hour while the Curtiss, takes about ninety minutes to Atlanta. The great airships of the future will have to sail past cities and towns not providing landing places. East Lake Club grounds, Atlanta, are not suitable for any machine larger than a Curtiss training plane, the maximum speed of which is about 65 miles per hour, while the De Havilands travel double that speed. Atlanta to Washington in five hours is certain before July 4.

The "Aerial Baggage Car" was third to leave on March 19 of the party flying to Atlanta. This was in charge of Lieut. Wilfrid B. Warde, accompanied by Master Electrician Dale W. Smith. This car carried the baggage of the party. The remainder of the party consisted of Col. W. E. Gillmore, Chief of Supply Division, with Lieut. Perry W. Blackler as pilot. Col. C. G. Hall, with Lieut. Alex B. McMullen as pilot. Lieut. Col. F. T. Dickman, Commanding, and Major John W. Butts, Executive Officer, escorted the party forty miles out. The boys christened Lieut. Warde the "Aerial Baggage Master."

In the capacity of "aerial freighters" the two De Havilands bringing Colonels Gillmore and Hall to this place from Montgomery returned carrying 300 pounds of sand in ballast. Had the ships desired to do a regular freight business they would not have been overloaded had they carried half ton each.

Tightening her collar and making sure the leash was firmly attached, the three-year-old fox terrier, Lieut. Samuel C. Stout's mascot, was a passenger in his ship March 20 to the upper air. The little mascot persisted in trying to walk out on to the hood covering the engine. At 4,000 feet Lieut. Stout commenced a series of acrobatic and a dozen loops in quick succession which never phased the little "tot." In fact, she wagged her tail in appreciation of the stunts. These movements quite often cause a novice to become deathly sea-sick. When placed on the ground "tot" by her actions was begging for another ride. In honor of the Victory loan "tot" which has been re-christened "Vic."

Carlstrom Field

On Friday evening, March 1, a masquerade ball was given by the Officers' Club of Carlstrom Field in one of the new hangars beautifully decorated with Spanish moss, palms, flags, toy balloons, etc. Many of the guests were tourists from the various Florida winter resorts which made it seem more like a home celebration to the boys from the north. Midnight supper was served on the Y. W. C. A. Hostess House veranda, and breakfast was served at the Officers' Club at 6:00 a. m. at the close of the dance. The music was supplied by the enlisted men's orchestra. During the evening the guests were thrilled by aerial stunts of Lieut. Gaston B. Mehler in an airplane illuminated by flares.

On Thursday, March 20, 180 cadets and 40 instructors arrived from Park Field, Memphis, Tenn. Park Field has been closed and the cadets are to complete their flying training at this field. The pursuit and gunnery schools have been abandoned until the cadets have been put through their primary training.

U.S.

U. S. Letters for collar insignia as prescribed by General Orders No. 74

FOR ALL OFFICERS
OF THE
UNITED STATES ARMY

Bronze of best quality with safety catch, 60 cents per set; without safety catch, 50 cents per set. Ready for immediate shipment.

The official standard samples on file with the War Department were manufactured by this Company.

Bailey, Banks & Biddle Co.
PHILADELPHIA, PA.

"THE SHARK." L-W-F BOMBER

L-W-F ENGINEERING COMPANY, Inc.
COLLEGE POINT, L. I.

TECHNICAL AERONAUTICS

Assembly of an Airplane

In the recently published book on airplane construction by King and Leslie, some very pertinent remarks were addressed to any one who has to do with the rigging or assembly of an airplane:

An airplane is designed to withstand the strains put upon it by the work which it is called upon to do.

It is a machine of accurate yet delicate construction and great care must be taken that no undue srtains are put upon it. An airplane rigger must necessarily have a fine conception of where any heavy strains may be placed upon it without causing distortion or breakages to its structural parts.

To the average layman, an airplane is a solid mechanical structure, and he has no preference in lifting any part of it, other than that of convenience. Some machines are marked with arrows denoting the points at which loads may be applied, but it is necessary for any airplane rigger to have a thorough knowledge of all these points and the reasons why loads may be applied at same. Frequently the machines have no load marks whatever and the aviation mechanic must naturally use his own judgment.

In climbing into the passenger's or pilot's seat care must be taken not to place any weight on the trailing or unsupported fabric of the plane. There is a re-enforced section called the sidewalk on the wing next to the fuselage generally coverd with corrugated rubber, upon which the weight may be placed. There is also a step in the side of the fuselage.

In turning a machine around by hand it is necessary to lift the tail post off the ground. In doing this, care must be taken to apply the lift under the *load* points. These points are the intersection points of the fuselage struts with the longerons and if not marked their positions must be determined before an attempt is made to raise the tail.

In applying lift to the panels, always lift directly under the points where the struts are attached to the wing beams. Were a strain to be placed upon the leading or trailing edges a permanent distortion would take place in the ribs of the wing. In the case of lifting on a trailing edge, which is made of flattened steel tubing, a permanent flexure would be given to it, spoiling the efficiency and disturbing the alignment of the machine.

A good rigger is more than a cog in the wheel in relation to the labors of an aerodrome's routine. He is an essential factor and his work determines the safety of those who fly the machines that are in his care.

In the event of engine trouble and the airplane having the altitude, a well rigged and balanced airplane will automatically take its own gliding angle and act as a parachute with the additional advantage that the landing ground may be chosen. If, through the fault of bad workmanship in rigging, some part should collapse, the pilot and passenger are helpless.

An efficient rigger should use care, accuracy and conscientious application in carrying out all duties that befall him.

The rigging of airplanes is an art and the airplane is a comparatively new invention. The scope of its field is unbounded. Let the prospective rigger keep this in mind, that the scope of his future may be high above the average tradesman.

Col. W. A Bishop Undergoes Operation

Col. William A. Bishop, famous Canadian aviator, was operated upon for appendicitis at Roanoke, Va., March 18. He was stricken as he was preparing to deliver an address. Latest reports state that his condition is satisfactory.

Colonel Bishop was the winner of the Victoria Cross and many other decorations for accounting for 72 Hun airmen.

Classified Advertisements

Rates, 25 cents per agate line per insertion. Black face type, 50 cents per agate line. Forms close Saturday preceding date of publication.

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IT IS a real American village. It is 20 miles west of the Mississippi River; its population—about 2600.

It gave its sons to war with an open hand and a glad heart.

Then—

The richest man in the village aged ten years in ten days. His only son lay dead in France.

The village butcher boy—born in Ireland—smiled for the last time in France. He died fighting for America.

The village Beau Brummel won the Croix de Guerre and lost his sight.

One family sent three sons and lost two.

Gas claimed a mere school boy of 19 years.

The realities of this village are the "might-have-beens" of all America.

But, thank God, America as a whole never really felt the hand of war—as England felt it, as France felt it, as our neighbor across the border, Canada, felt it.

And why?

Because your dollars stopped the war. Your dollars made possible those tremendous preparations for a long war which resulted in a short war. Your dollars bought such an array of tanks and trucks, guns and gas, bayonets and bombs, planes and pontoons, shot and shell, that Germany wilted—a year ahead of schedule.

Half a million American boys were saved.

The dollars that did it are still in your pocket.

For America prepared on Faith. She knew that true Americans held their dollars cheaper than their sons. She knew that American thrift would gladly take the place of American blood.

America now asks you for those unpaid dollars.

Let your heart say *how* thankful you are that half a million American sons were saved.

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GERMANY SURRENDERS!

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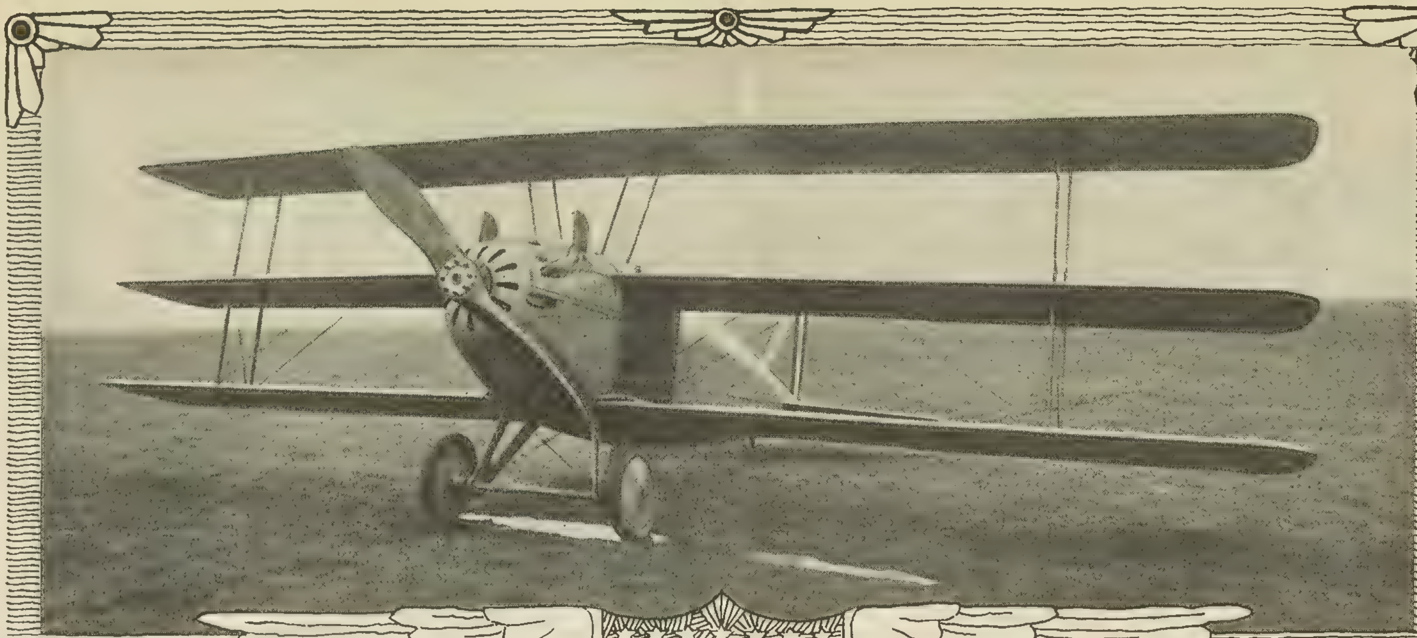

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AIRCRAFT JOURNAL

Formerly Air Service Journal

The National Aeronautic Newspaper

VOL. IV. No. 14 NEW YORK, APRIL 5, 1919 PRICE 10 CENTS

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APR 9 191
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AIR SERVICE IS TO BE A SEPARATE ARM

5,100 Planes, 1,923 Officers and 21,853 Men Will Be the Basis of the Reorganized Air Service Tentative Plan Announced by the War Department

As forecasted in last week's issue a program for the development of the Air Service on a permanent basis has been announced by the War Department. This plan provides for 5100 planes of all types, 1700 in active commission and 3400 in reserve. This is based upon the proposed military establishment of 500,000 men, in which total the Air Service personnel will be 1923 officers and 21,853 men.

The organization tables show the air forces on a peace basis will comprise eighty-seven service squadrons, of which forty-two will be assigned to coast defence work in the United States and insular possessions, twenty will be pursuit squadrons and twenty-five observation and bombing squadrons. The typical army airplane squadron includes eighteen 'planes in service and their personnel.

Forty-two Balloon Companies

The tables also call for maintenance of forty-two balloon companies divided into three wings of fourteen companies each.

The general plan of the army reorganization calls for twenty-one divisions, including one cavalry unit of nine regiments, to be formed into five army corps, to be stationed in five different sections of the country, each to be commanded by a lieutenant general. To each corps will be attached five observation and bombing squadrons and four pursuit squadrons, representing a wing formation for each type of machine.

The effects of this will be to give the Air Service definite recognition as the fourth service of the line, or combat forces of the Army, the others being the old trio of artillery, cavalry and infantry. All other units are supplemental forces, generally known as auxiliary arms or staff corps troops.

A. S. Tactical Formation

Carrying out the organization of this new element of the line, the tactical formation of the airplane branch of the Air Service will be in squadrons, groups, and wings and the balloon section in companies, groups and wings.

The formation is elastic, however, above the squadrons, two or more squadrons, as circumstances require, forming a group and two or more groups a wing. The same arrangement prevails with infantry division, two or more of which form a corps.

Storage capacity has been provided for approximately 6000 complete 'planes, not including those in service or in immediate reserve with the squadrons. In addition airplane motors by the thousand have been stored, the upkeep of any unit in service requiring three or four extra motors a 'plane.

Photo by International Film Service

VICTORY ARCH, NEW YORK

When the famous 27th Division marched up Fifth Avenue, New York, on March 25, it was greeted by the largest crowd ever assembled for any parade; new aerial decorations were in evidence.

The Victory Arch at Madison Square was flanked by spherical balloons. The machine over the Flatiron Building is the Glenn L. Martin Bomber which was used to take aerial moving pictures of the returned heroes.

Must Buy Many Machines

To make this plan effective will require the purchase by the Government of several thousand airplanes of types which the Air Service does not at present own. Bombing planes, single seater fighters and two seater fighters will be required.

The present D H-4 will have to be remodeled to bring it up to date for observation and photographic work. Advanced training types will also probally be needed.

To secure the above equipment will require no new legislation for there are funds available from present appropriations to cover the cost of the new machines.

The purchase of sixteen fields and the extension of the leases on ten others indicated that a large program was in contemplation and the present plan is evidently the first step that will be taken to create in this arm an effective fighting force.

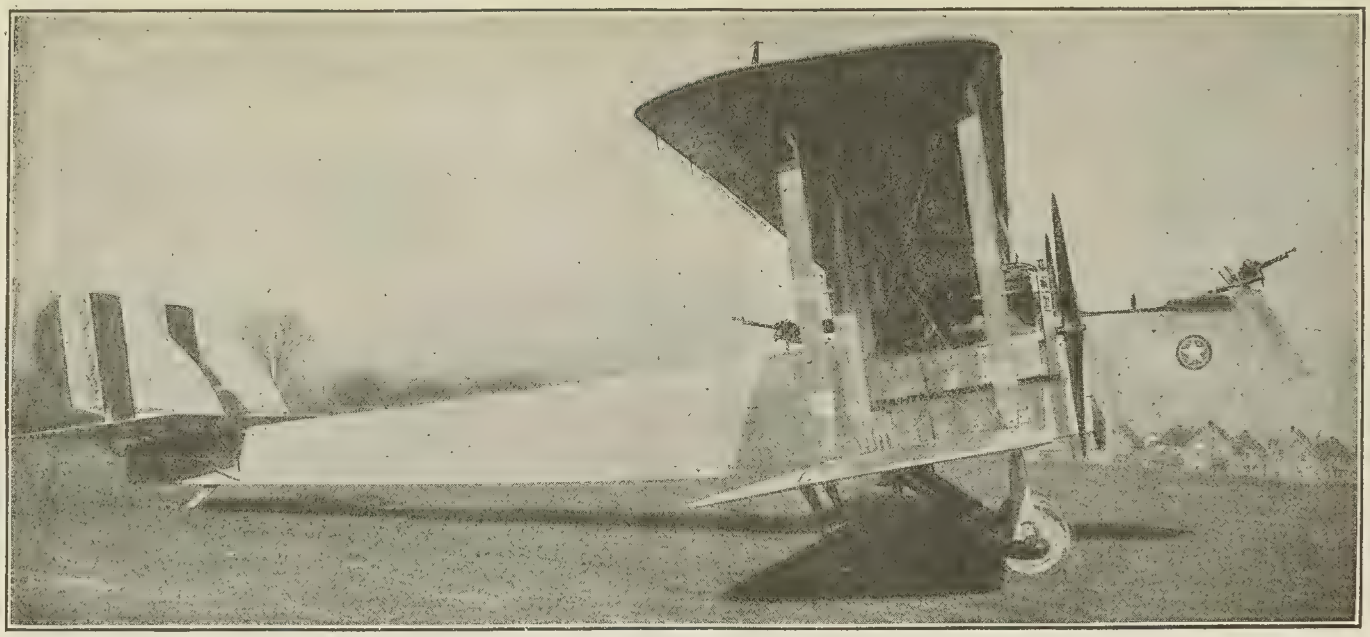
Selling Plan Soon

Despite some minor sales and the fact that inquiries regarding the disposition of aeronautical equipment have been invited, the Army Air Service has not yet, with minor exceptions, made any sales of the surplus engines, airplanes and aeronautical supplies it has on hand. However, a selling program has been determined upon and it is expected formal announcement of it will be made shortly.

The Air Service, in view of its rapid shrinkage to a peace basis, is as much troubled with a plethora of equipment as it was with too little a year ago. As production did not cease entirely the day the armistice was signed, and as shipments did cease, the Air Service has been swamped with the flood of production which, although it had not reached its maximum, was running deep and strong when hostilities ceased. In October the planes were pouring out of the factories at the rate of more than fifty a day, and of the motors the Liberty alone was coming forth at the rate of 130 a day. The entire motor production was proceeding at a rate greater than that of the French or British output combined.

Some "Liberties" to Be Sold

The machines and motors that will be offered for sale now are largely of the training types or have seen some kind of use. It is understood the Liberty motors probably will not be offered now for general sale, although some of them will be parted with for special uses and where their sale will tend to promote the development of aviation. About 10,000 "Liberties" are now in this country.



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The forerunner of the wonderful

AERIAL FREIGHTER *and* TWELVE PASSENGER AIRPLANE

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The Aircraft Journal

WITH this issue the Air Service Journal becomes THE AIRCRAFT JOURNAL. During the war, when the Army and Navy Air Services amounted to nearly two hundred thousand officers and men, and many fields were in active operation, the news of the work done was so plentiful that a publication was needed to cover this field exclusively. With the changed conditions many of these men will wish broader information regarding aircraft than service news. In order to give this under a representative name the change has been made.

To give the general news of military, naval and postal aircraft operations, as well as following the development of aircraft in all its different phases will be the aim of THE AIRCRAFT JOURNAL. Lighter than air craft will become increasingly important and this branch of aeronautics will receive proportionately greater attention. To cover the whole field of aircraft activities in an interesting manner will be the purpose of the publication in its new field.

Types of Service Airplanes Needed

THE announcement that plans promulgated in Washington contemplate an Air Service of approximately 1700 planes in commission and 3400 in reserve will lead all those who take more than a superficial interest in aviation to await with eagerness an announcement of forthcoming types.

Whatever the future development may be, the basis of any Air Service at present is its two-seated observation squadrons who do the work of observation, both visual by day and by night and photographic, infantry liaison and artillery adjustment. A squadron of airplanes of this type must be provided for every divisional staff, corps staff and army staff. The plans announced by Washington call for forty-two coast defense squadrons and twenty-five observation and bombing squadrons. Inasmuch as the coast defense squadrons under Army control will not be called upon to operate far beyond the range of the coast defense guns—all work further at sea is at present the duty of the Navy—the forty-two coast defense squadrons will probably be of the two-seater type and will be land machines, not boats or seaplanes, essentially similar in type to the observation squadrons; probably something along the general lines of the French Salmson, the DH-9 or the German Rumpler.

But the very existence of any Army's observation air service depends upon a large and aggressive air service whose duty is to fight the enemy in the air. Pursuit and Day Bombardment Squadrons have this as their primary function. To judge from the opinion of officers of the American Air Service of wide experience in France a rotary or radial engine of 250 horsepower will be needed before the ideal pursuit airplane for low altitude work (under 12,000 feet) can be developed. Given such engines, they would apparently like to equip a large proportion of their pursuit squadrons with them and of these squadrons at least one Group would be armored against machine gun fire from the ground and equipped with two machine guns in the horizontal axis of the machine and synchronized to shoot through the propeller, and four additional machine guns. This Group would be used to attack ground objectives—battery positions, transport and convoys on the march, reinforcements and enemy machine gun nests.

The remaining pursuit airplanes should, in the opinion of the fighting officers of the Air Service, probably be equipped with at least a 300 horsepower stationary engine and the qualities demanded of such a machine would be the qualities typified by the Spad, high speed, great climbing powers and ruggedness of construction, permitting a prolonged dive at full throttle and " brutal " handling. Manoeuvrability would necessarily be sacrificed.

It is believed that the day has arrived when it is worth while to equip every type of military airplane with bomb racks to carry a few bombs of a larger or smaller size to be dropped as opportunity is offered in the course of other routine work. This was being done to all intents and purposes before the signing of the armistice in France, and while the material effect was possibly slight the moral effect was such that it was reported that, as a rule, German troops sought cover upon the approach of any American airplane. In the design of all types this fact must be taken into consideration.

For the design of the Day Bombardment planes, however, the qualities desired are excellent visibility for both pilot and bombardier, with a wide field of fire, high speed and climb, good weight carrying properties, and as high a degree of immunity to hostile gunfire as possible.

In regard to service types of airplanes it may now be taken for granted that the art of flying has reached a point where with proper lighting facilities any plane which can be flown by daylight can be used for a similar purpose by night. The development of special types for night work seems less and less probable.

For training there seems likely to be a gradual improvement in types, but the essential ones—the 100-horsepower dual control primary training airplane, the 150-horsepower type slightly more advanced, and the single seater with a rotary motor, short tail and good concentration of weights are all likely to be with us for many years.

Municipal Landing Fields

THE increasing interest in the establishing of municipal landing fields by Chambers of Commerce is apparent from the amount of news that is being published in local papers throughout the country. The main difficulty seems to be the securing of equipment and personnel for use at the fields.

The possible utilization of the surplus equipment of the Air Service is being considered in this connection and it is hoped that some way may be found to make this available. If an officer could be detailed to each of these fields and the initial shop and airplane equipment given in exchange for the assurance that a definite number of pilots would receive training at the field during the year, the plan might receive consideration. A similar plan has been in operation at universities and colleges where land grants and government subsidies have been liquidated by military training.

A plan of this kind would give cities an opportunity to commence aerial activity in a preliminary way, and start the chain of landing fields which are now so urgently needed for cross-country flying.

Entrants "Tuning-Up" for the Overseas Flight

If the Weather Is Clear the U. S. Navy Attempts Will Be Made Early in May —Pilot Hawker Nearly Ready with a British Sopwith—Other Entries

Photo by International Film Service

OFFICERS ASSIGNED TO WORK OUT PLANS FOR AMERICAN TRANSATLANTIC FLIGHT

Six officers of the Navy and one of the Marine Corps who have been assigned to the transatlantic section of the office of the Director of Naval Aviation, in connection with the preparations for the flight across the Atlantic Ocean:

From left to right the officers are: Commander J. H. Towers, U. S. N. (in charge); Commander H. C. Richardson, Construction Corps; Lt.-Commander P. N. L. Bellinger, U. S. N., Operations; Major B. L.Smith, Marine Corps; Lt.-Commander G. deC. Chevalier, Operations and Liaison; Lt.-Commander R. E. Byrd, U. S. N., Navigation and Lt. Barrat, U. S. N. R. F., Aerography

On the first clear day during the first week in May, or as soon thereafter as the fog belt which now envelops the Newfoundland coast shows signs of clearing, the Navy will undertake the flight over the Atlantic Ocean.

This definite information has been received from Washington and was made public by the Manufacturers' Aircraft Association. Other facts, now made known for the first time, are:

The Navy experts in charge of the Trans-Atlantic Section are so confident of the ability of the N-C (Navy-Curtiss) boats to make the nonstop voyage that they are willing to go to sea without the assistance of mother ships.

Gross Load of 26,000 Pounds

During trials at Rockaway last week, one of the flying boats got off the water with 26,000 pounds gross load, as against the 22,000 at one time thought the limit. This means that the craft can and probably will carry sufficient gasoline to cross from Newfoundland to the Irish coast without alighting for fuel.

Mother ships will be employed, however, it is stated, to insure against possible disaster should one of the flying boats encounter storms.

The United States Weather Bureau is gathering information from the North Atlantic and from these data charts are being made for the guidance of the navigators. Reports are being received daily from United States naval vessels. Observations on the surface of the sea and records obtained by means of test balloons, provide the basis for forecasts as to weather conditions probable early in May.

It is known definitely that none of the flying boats to undertake the trip will carry newspapermen or correspondents. The crews of five men to each boat will consist of pilots, mechanicians and aerographers. One of the crew will also be a wireless operator.

Everything Sacrificed for Weight

The Navy has sacrificed everything possible for weight and it was a question whether the chief photographer of the department should form a member of the party. The decision finally was made in the negative. Instead, four hand cameras will be included in the equipment of the first boat and the members of the crew are taking instruction in photography.

Very little food will be carried. The necessity for this will be removed by the use of mother ships. The Naval aviation service has developed a special type of sea-going vessel adapted to the care and repair of flying boats. It is this type which probably will be spread over the Atlantic. Destroyers, such as that dispatched a few days ago to Newfoundland with supplies for the flight, also will form links in the safety line.

In the tests that are now going on, the N-C boats have developed astonishing possibilities. After trials they are taken out of actual flying so that alterations and improvements may be made in the shops of the Curtiss Engineering Corporation at Garden City, where they were built.

Unlike individual aspirants, the Navy is placing no great dependence on favoring winds. It is true that the prevailing current is from west to east, but with a boat of the N-C class it is unwise to count on more than occasional assistance from the wind. This is explained, according to the Manufacturers' Aircraft Association, by the pilot chart which is being used in preparation for the flight. In each five degree rectangle is what is known as a wind rose, which indicates the wind to be expected.

The statement was made recently that, by climbing to 12,000 feet a trade wind could be found, sufficiently strong to speed the machine safely to its destination in Europe. The statement is made that no wind tests at an altitude of 12,000 feet have ever been made over the Atlantic along the Newfoundland-Ireland air course. Instead, the available data show that for only eight days in the month in which the flight is expected to be made, and then during only 25 per cent of the day, is there a strong wind bearing to the east up to an altitude of 2000 feet. This altitude, it is stated, is probably the one at which the Navy flight will be averaged. No navy craft has been built for the high ceilings necessary to army work.

How the Navy Proceeded

It is now possible for the first time to trace in detail the steps taken by the United States government with regard to aerial navigation over the Atlantic. The story reveals patient personal endeavor on the part of a few far-sighted Navy officers and co-operation between federal and private designers to the end that the greatest flying boat in the world could be evolved. Little has been said officially of this phase of the great enterprise, although it is now pointed out by the Manufacturers' Aircraft Association, preparation, along the lines followed by the Navy, sharply separates this endeavor from some ephemeral schemes which have sought publicity.

Officers in Charge of the Undertaking

The result of this review was apparent February 6, this year, when Commander Towers was detailed to a new work classified as the Trans-Atlantic Section of the Navy. A few days later details which are now being carried out were approved. Then followed the expansion of personnel, with the detail to the Section of the following:

Lieut. Commander P. N. L. Bellinger, former commandant of the air station at Hampton Roads; Commander H. C. Richardson, of the construction corps; Major B. L. Smith, of the Marine Corps; Lieut. Commander G. de'C. Chevalier, operations and liaison; Lieut. Commander R. E. Byrd, navigation, and Lieutenant, Junior Grade, R. F. Barrat, aerography. All are pilots except Barrat, who is an aerographer or meteorologist.

It is definitely known that the Transatlantic Section has prepared in detail several plans for the flight. It is not yet known which of these plans will be used, and, indeed, can not be known until the start actually is made. Each plan calls for a separate route, although all designate Newfoundland as the point of departure.

Concerning Distances

Much misinformation has been disseminated regarding distances, says the Association statement. It would be preferable to start from Long Island, where there is so high a percentage of sunshine. But a glance at the great maps prepared for this flight reveals why Newfoundland, despite its fogs and storms, has been chosen by both the British and the Americans. It is thirteen hundred nautical miles from Rockaway to Newfoundland and only 1,680 nautical miles from Newfoundland to the Irish coast. Some day, the Naval aviators say, flights will be made from the English harbors to the sheltered waters of Rockaway, but the demonstration of the Newfoundland-Ireland flight must come first.

Development of the N-C Type

Day after day, along the Long Island coast, the N-C boats are being tried out. Some remarkable achievements have been recorded and these enable the public to learn something of the evolution of the ships.

In the early fall of 1917 it was decided that the design and construction of still larger flying boats than were in existence should be undertaken with the object of obtaining both large radius of action and large useful load, together with seaworthiness quite as distinct as airworthiness. This was undertaken jointly by the Bureau of Construction and Repair, Navy Department, and the Curtiss Engineering Corporation, of Garden City. Glenn H. Curtiss and his assistants were invited to a conference in Washington with Naval Constructors Richardson, Westervelt and Hunsaker.

The plans evolved became the N-C Type, of which four were ordered, the fourth now nearing completion. The maiden flight of N-C 1 was made October 4, 1918, when, beginning with a load of 16,200 pounds, the ship got off the water in 36 seconds. As soon as Nos. 2 and 3 were completed they were put through tests which demonstrated that it was possible for them to take off with 23,000 pounds. This was regarded as remarkable, inasmuch as the craft were designated for fighting and not for weight carrying. The limit is now set at 26,000 pounds.

The signing of the armistice ended the usefulness of the N-C boats for submarine chasing and the Navy immediately set about developing them into practical long-distance commerce carriers. The Atlantic flight is generally regarded as the laboratory for a specific demonstration that international aerial navigation is a fact.

British Plans

So far there are nine entrants for the London *Daily Mail* $50,000 transatlantic flight prize—eight of them British and one Italian.

The *Daily Mail* names five British machines entered through the Royal Aero Club and three others, including a British Handley Page, and an Italian Caproni.

The contest has interested the most famous pilots and areonautical constructors. Sydney Pickles and Harry Hawker (both Australians) and F. Raynham were prominent in air navigation before the war, and Major J. C. P. Wood, who will pilot a Short biplane with a Rolls-Royce engine, has a fine flying record with the British air force.

All Are Competent Pilots

Capt. C. W. F. Morgan, navigator of the Martinsyde Rolls-Royce biplane lost his right leg below the knee in the war. Morgan says his artificial limb does not hamper him when flying. Sydney Pickles was flying from France in a seaplane, in July, 1913, when the engine failed over the Channel, but refusing the assistance of a steamship he repaired the engine on the water and "taxied" into Folkstone. Capt. Morgan is now on his way to Newfoundland. Pickles learned to fly in the earliest types of Caudron, Grahame-White and Handley Page machines. Since then he has flown nearly every type.

Capt. Arthur Payze, the first British entrant, who is still working on a Whitehead biplane at Richmond, has had remarkable escapes. While flying over the lines in France he was hit on the head by shrapnel, and fell several hundred feet before gaining control of his machine. He was piloting a machine in which the late A. Poyle of the Whitehead Aircraft Company carried out his fatal experiment with a parachute and saw the unfortunate airman fall 1,000 feet to death.

Major Wood is probably the youngest airman in the competition, and will pilot a Short biplane. His early experience was in the last African campaign, afterward he was on the Western front, where he gained the reputation of being a very stout pilot. He has flown more than 10,000 hours in service flights.

The third week in April should see at least four competitors ready at their starting point.

The Sopwith plane has arrived at St. John's in good condition.

Pilot Hawkers' Plans

Concerning his plans Pilot Hawker says: "We propose leaving St. John's, N. F., about 4 o'clock in the afternoon and travelling through the night, we hope to pass the south coast of Ireland shortly before noon the following day, English time, arriving at the Brooklands airdrome, near London, at 4 o'clock, a total flying time of nineteen hours and thirty minutes.

"In case we are forced to descend into the sea the 'fairing' of the fuselage is so constructed that it forms a boat large enough to support us both in the water for some time. In addition we shall wear life saving jackets. A medical officer in the British Air Ministry made up for us some scientific food sufficient for forty-eight hours. This includes sugar, cheese, coffee, sandwiches, toffee and tabloids."

Other Aspirants

Colonel Ray Collishaw, a Canadian aviator, left Halifax, N. S., on the steamship Olympic for England March 31 to bring back an airplane with which to enter the transatlantic contest. He will attempt his flight from Newfoundland early in May, accompanied by Major McKeever and a wireless operator.

Eddie Stinson, the well-known flier and instructor, standing beside the ACE Model Airplane built by the Aircraft Engineering Corporation, which was purchased by him for exhibition work. He made several test flights with the machine, putting it through the stunts which he would use in exhibition work.

Colonel Collishaw expects to accomplish the flight in twenty hours. His airplane will be equipped with five motors of four hundred horse power each. It will be capable of carrying fifty persons and remaining in the air thirty hours.

Captain Zuloaga, who crossed the Andes Mountains in a balloon in 1916, has asked the permission of the Argentine War Minister to attempt a flight across the Atlantic in an airplane. The captain is the Argentine Military Attaché in Paris.

ATLANTIC CITY AIR MEET

Many Prizes at the Pan-American Aeronautical Convention Next Month

At the Second Pan-American Aeronautic Convention to be held at Atlantic City in May many prizes will be competed for and several noted fliers have indicated their intention of participating in the contests.

Col. Wm. A. Bishop has offered a trophy to be known as the Ace of Aces trophy to be awarded in 1919 to the flier who makes the best speed between Toronto and Atlantic City

The Atlantic City Aero Club has offered $10,000 to the pilot who begins or ends a transatlantic flight at Atlantic City during the month of May.

The Valentine prizes for seaplanes amount to $1850 and are to go to the pilot who makes the greatest number of laps between Atlantic City and Cape May Naval Air Station during the convention.

Glenn H. Curtiss has offered a $1000 prize to the first pilot who flys 1000 miles without stopping in contests for the Curtiss Marine Flying Trophy.

Speed prizes for seaplanes to be competed for on May 30 amount to $1750.

Many medals are offered for various special events and $2000 is offered for the winner of intercollegiate contests.

The races and contests will be continued through the three summer months.

Latest Developments in Technical Aeronautics

New Supercharging Device to Enable Military Airplanes to Achieve the Highest Possible Ceiling—Gluing Up Propeller Laminations

By Alexander Klemin

Supercharger for the Aviation Engine

During the war the great problem of aerial fighting was to achieve as high a ceiling as possible, and to maintain good fighting speeds at high altitudes. To achieve a decisive supremacy in this respect the Technical Services of the allies, worked simultaneously, though independently, on the realization of a device to supercharge the engine. A supercharging device is one which increases the power of an internal combustion engine above that which it would normally have at the particular atmospheric pressure at which the motor may be operating. Supercharging as applied to the aviation engine does not imply the increasing of the air density above that which would obtain at sea-level, but means merely the maintaining of sea-level atmospheric conditions as the altitude is increased. In other words, it is not desired to increase the sea-level horse-power, but to keep the power as nearly at a constant value as possible as the altitude is increased. Therefore it is the object of the supercharger to supply only enough additional air to maintain the supply equal to that on the ground.

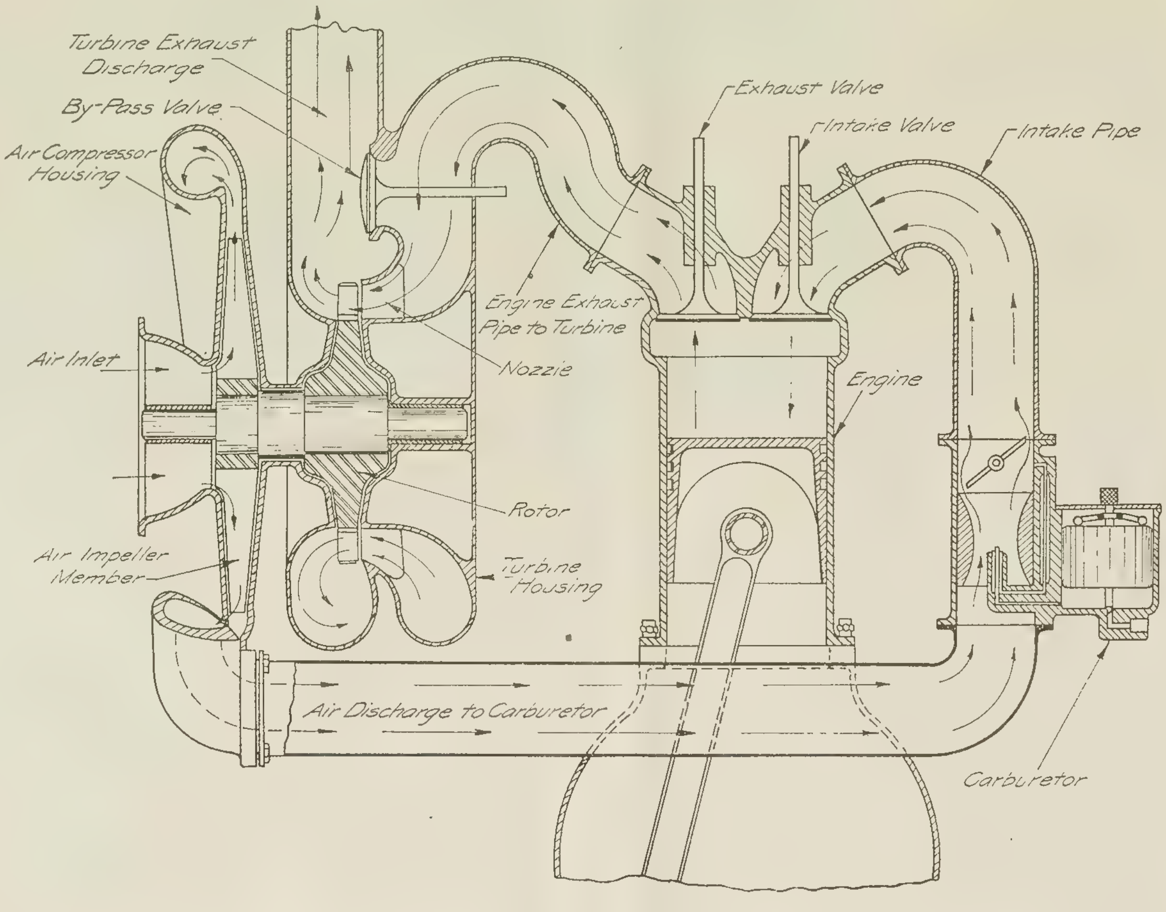


Diagram Showing the Principles of Operation of an Exhaust-Driven Turbo-Supercharger

An engine without supercharger loses about 43 per cent of its ground level power when operating at an altitude of 15,000 feet. Generally speaking, tests have shown that the power absorbed by a compressor in order to recuperate this loss, assuming an efficiency of 50 per cent is about 6 per cent. The net power recuperation then is approximately 37 per cent of the initial power possessed at ground level. To show any decided practical advantage a compressor unit and attendant devices should not weigh over 2 lbs. per recuperated horse-power. And of course any increase in weight also means increase in wing area and in aerodynamic resistance.

To get the greatest possible efficiency from any type of supercharger it is advisable to have an adjustable pitch propeller. A fixed pitch propeller designed to hold the engine to a certain maximum speed at the ground level would on account of the lesser density of the air at altitudes, allow the engine to operate at too high a speed if the engine maintained its power at high altitudes.

There are three different types of compressors which can be used for supercharging purposes: reciprocating, rotary and centrifugal.

The first of these is obviously required to have a volumetric displacement in a unit of time greater than that of the engine. This would make necessary larger diameter pistons, or a compressor occupying about the same space as that taken up by the engine itself. This consideration alone would obviously eliminate the reciprocating type, due to great weight and bulk.

The rotary compressor has been shown experimentally as able to operate successfully over long periods of time, although it is light and occupies a small space. The centrifugal compressor is also small and equally satisfactory. It is these two types alone which can be considered.

The compressor can be direct connected to the crankshaft of an engine through a set of multiplication gears to attain the proper speed for the compressor rotor. It can be driven by a steam turbine, the steam for which is generated by the exhaust gases of the engine. Or it can be operated by an exhaust gas turbine getting its energy from the engine exhaust gases direct.

In the first method, the main difficulty is the problem of taking care of the stresses set up in the rapidly moving mechanism due to sudden variations in the engine speed. This can be overcome by either a properly designed system of clutches or by a very light gear drive and very light compressor so as to keep the inertia forces low. The steam turbine is out of the question, because it would require a boiler and condenser to re-convert the steam from the turbine besides other apparatus. making a very bulky installation.

The exhaust gas system seems very promising, and avoids both a bulky installation and the interposition of a mechanical drive. All exhaust turbine supercharging units which have been developed so far adhere to the principle first utilized by Rateau in France. Briefly the system consists in conducting the exhaust gases from the engine to a nozzle-box and thence through nozzle ports to a turbine wheel around which is the atmospheric pressure at any given altitude. The exhaust gases are discharged from the engine at a normal pressure of about 30 inches of mercury, and therefore the expansion from this pressure to that of the rarified atmosphere at the given altitude is sufficient to operate the turbine wheel at some 20,000 to 30,000 r. p. m. On the same shaft with the turbine rotor is the impeller of a centrifugal compressor which raises the air pressure from that at the altitude at which the device is operating to normal sea level pressure and delivers this compressed air to the induction piping system of the carburetor. The engine therefore exhausts at normal sea level barometric pressure and receives its air at the same sea level pressure, working entirely under sea level conditions.

The whole system is shown diagramatically in the figure printed herewith.

The effect of maintaining the power of the engine at altitudes on the performance of an airplane is wonderful. Of course the improvement depends to some extent on the characteristics of the plane. But it is safe to say that an increase in ceiling of 20 per cent, and an increase in speed at an altitude of 20,000 feet of about 50 per cent could be achieved. Thus the De H 4 which makes about 125 m.p.h. at ground level could make about 170 miles at 18,000 feet altitude. This may seem paradoxical but can be easily ex- of the plane at the same increases, the resistance plained. As the altitude angle of incidence diminishes. The lift coefficient also diminishes, and the speed must increase for the necessary sustentation to be maintained. With the engine power the same, and the resistance diminished it is possible to attain the greater speed and climb.

Gluing Up Propeller Laminations

The process of building up a propeller is always a delicate one, and a good propeller, structurally speaking, is the result of many shop wrinkles. An important rule to be observed is the heating of laminations of the propeller blade before gluing up.

Laminations thus heated before gluing give joints which are less likely to open, and show greater uniformity of strength. When laminations are glued up without heating the full strength of a hide glue—commonly used in propeller work—is developed in a period of eight hours' duration regardless of the species of wood used.

Where laminations are heated before gluing, the heat introduced retards the setting of the glue to such an extent that mahogany shows a slight increase in strength even after 10 hours' duration under pressure.

And the woods of higher thermal capacity require even longer periods under pressure, the full glue strength not being developed even after a period of 12 hours.

News and Views of the U. S. Air Services

Air Service Reorganization

The War Department authorizes the following statement from the Office of the Director of Air Service:

Co-ordination of all Army aerial activities under one head—the Director of the Air Service—is the aim of reorganization now under way, that is, the substitution of the fundamental principle which made possible unified operations overseas, for the rather cumbersome methods followed in the United States in the past.

The reorganization is designed to supersede the complicated dual wartime air establishment, and at the same time to develop peace-time activities, thereby assuring the full use of industrial, training and operation gains achieved during the conflict with Germany.

Major Gen. Charles T. Menoher, who at the time he was called to become Director of the Air Service, was commander of the Sixth Army Corps and throughout its long service at the front was in command of the Forty-second (Rainbow) Division, has endeavored to apply to the Air Service the principle of coordination which was followed overseas, not alone by the United States, but by Great Britain and France. He found the air establishment in two parts—Division of Military Aeronautics and Bureau of Aircraft Production. This plan of organization was temporary, destined under the terms of war legislation to pass out of existence six months after the signing of the treaty of peace.

Having in mind the problems of the future, General Menoher proposed a reorganization based on the divisional system. As Director of the Air Service he assumes the position of responsibility. As an advisory board, each member representing an important branch of the service, he has designated the following: Col. Walter G. Kilner, Col. Arthur L. Fuller, Col. Henry C. Pratt, Lieut. Col. George B. Hunter, Lieut. Col. B. Q. Jones and Maj. Charles R. Cameron.

Dealing directly with him also are the air attaches of foreign Governments, thus enabling him to keep in contact with developments at home and abroad.

As every division overseas has had a general staff, so the new Air Service has an executive organization. To carry out the policies which he alone formulates and to attend to the secretarial duties, the Director has designated an executive officer, Col. Milton F. Davis. Where two or more groups are concerned in any action, their activities are co-ordinated by the Executive Officer in carrying out the policies dictated by General Menoher.

The problem of dividing properly the duties of the various branches was solved by turning once more to the divisional system followed so successfully overseas. The work has fallen naturally into four main channels or groups—Training and Operations; Supply; Executive and Administrative; and Information, Publication and Statistics.

The Chief of the Supply Group has charge of supplies, airplane engineering, production, procurement, inspection, maintenance and finance disbursement for the entire Air Service, including both the old branches, Aircraft Production and Military Aeronautics.

LT. COL. BYRON Q. JONES

Probably no officer in the Air Service has had the experience in the testing of American airplanes of all types of Lt. Col. Jones. He has been on duty with the Technical Section and now is a member of the Advisory Board to the Director of the Air Service

The Chief of the Information Group gathers and distributes all information, statistics and publicity. In war time he would have charge of intelligence work for the whole Air Service.

The Chief of the Training and Operations Group directs all training and operations.

The Chief of the Administrative Group is practically the Adjutant General of the Air Service, controlling administration and executive work, personnel, office management, the medical section, cables, correspondence, etc.

Brig. Gen. William Mitchell assumed charge of the most important activity, that of Training and Operations. Col. William E. Gillmore became Chief or Supply, Lieut. Col. William F. Pearson assumed charge of administration, and Major Horace M. Hickam became Chief of Information. It is to be noted that the Supply, Administration, and Information Groups exist practically for the creation and maintenance of the Training and Operation Group. The latter is the most important, and has at its head the ranking officer among the branch chiefs—Brigadier General Mitchell.

Each branch chief is directly responsible to the Director of the Air Service, and in this manner the activities of the entire service are co-ordinated in and centered upon the office of the Director.

Again, following the overseas divisional system, the Director has designated the Supply Group as first in the organization, Information as second, Training and Operations as third, and Administration as fourth. This does not imply rank. Each chief is immediately responsible to the Director. The Director designates what action is to be taken, lays down service policies and co-ordinates the activities of all four branches.

The primary purpose of this organization is to develop the Air Service, co-operate in the advancement of commercial aeronautics and promote the principle that the United States deserves a leading place in the air, promised by our original application of the principles of mechanical flight.

A. S. PERSONNEL ORDERS

On March 17, 1919, the following named officers, having reported to the Director of Air Service, Washington, D. C., were assigned to duty as indicated:

Lt. Colonel Wm. L. Sheep, M. C., to Administrative Staff, and Major Oro M. Baldinger A. S. A., to Training and Operations.

Lt. Colonel William C. Sherman, Corps of Engineers, having been detailed to the Air Service and having reported to the Director of Air Service has been assigned to duty with the Training and Operations Group.

The appointment of Lieutenant Colonel Edward E. McCammon, A. S., A. P., as Assistant to Chief, Air Service Materials Inspection is announced.

Effective March 18, Major Maurice Connolly, A. S. A., is relieved from present duty and is assigned to Training and Operations Group.

Col. George H. Crabtree, M. C., and Col. Albert E. Truby, M. C., have been ordered to proceed from Washington, D. C., to Millington, Tenn.; Dallas, Texas; Fort Sill, Oklahoma; Fort Worth, Texas; San Antonio, Texas; Houston, Texas and Lake Charles, La., on temporary duty. They will attend an important meeting of flight surgeons at Dallas, Texas, and coordinate the work of demobilization and reorganization of the medical service at other stations.

Lt. Col. Thomas S. Bowen, M. A., A. S. A., was assigned to Training and Operations Group on March 17.

Col. Henry C. Pratt, A. S. A., was assigned to Office of Director of Air Service on March 20, 1919.

Lieut. Col. Henry W. Harms, J. M. A., A. S. A., is relieved from duty as a member of the Advisory Board, Air Service, created March 13, 1919, and Lieut. Col. Byron Q. Jones, M. A., A. S. A., is appointed a member of the Advisory Board, Air Service.

SERVICE ASSOCIATION MOVES

The publication office of *U. S. Air Service* and the office of the Army and Navy Air Service Association have been moved from Building D, 6th and B Sts., Washington, D. C., to Room 645 Munsey Bldg., Washington, D. C.

This new location will be a convenience to the business interests of the Association and particularly the magazine. Members of the association, as well as prospective members, will be welcomed when in Washington.

The Secretary, Capt. Earl N. Findley, A. S. A., and Lieutenants Meade and Metcalf, who have been detailed as members of the magazine staff, are now located in the new offices.

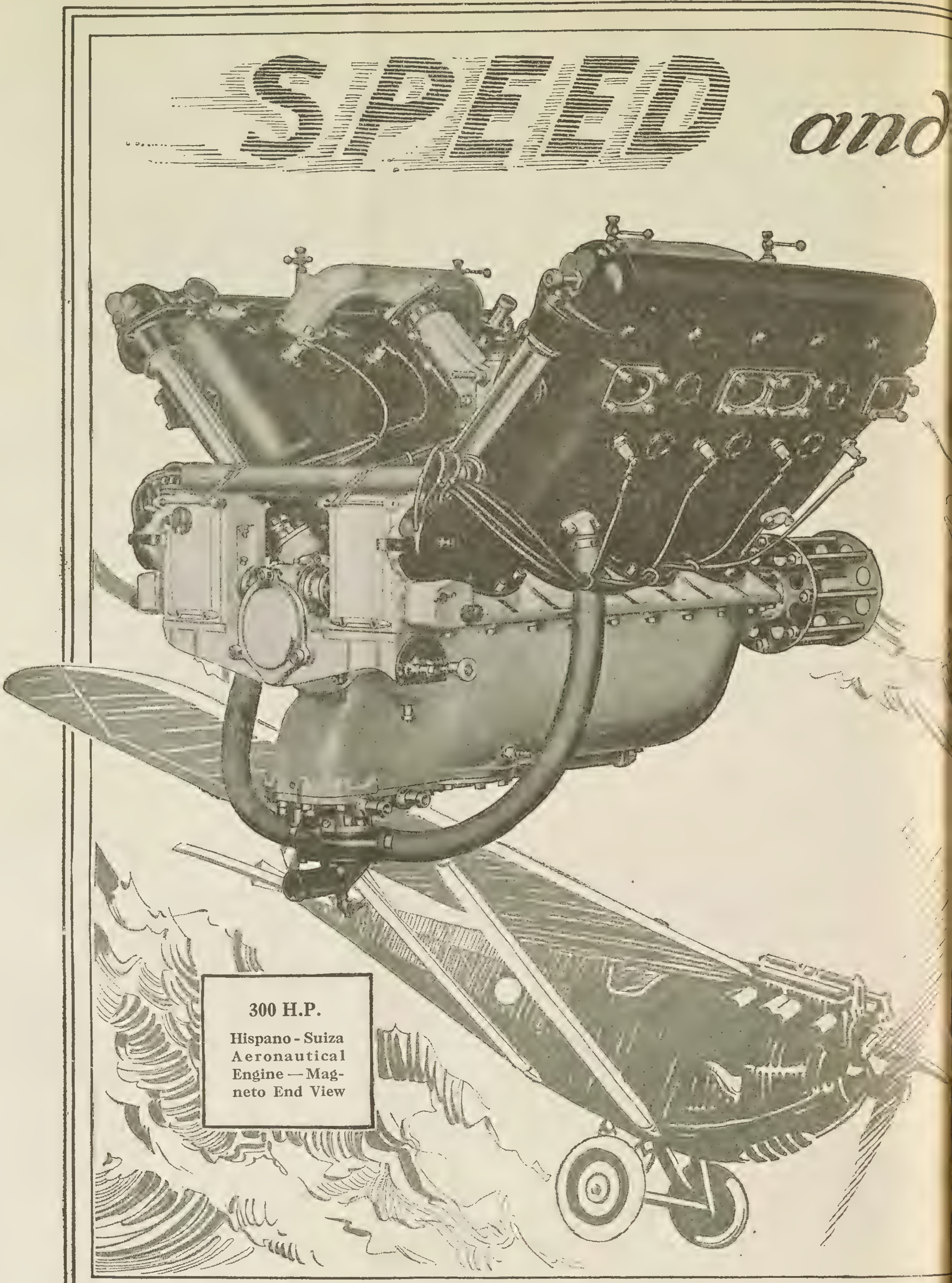
SALES OF PLANES AND EQUIPMENT

The War Department authorizes the following statement from the Office of the Director of Sales:

Sales reported to the Office of the Director of Sales from March 8 to March 14, inclusive, include the following Air Service equipment:

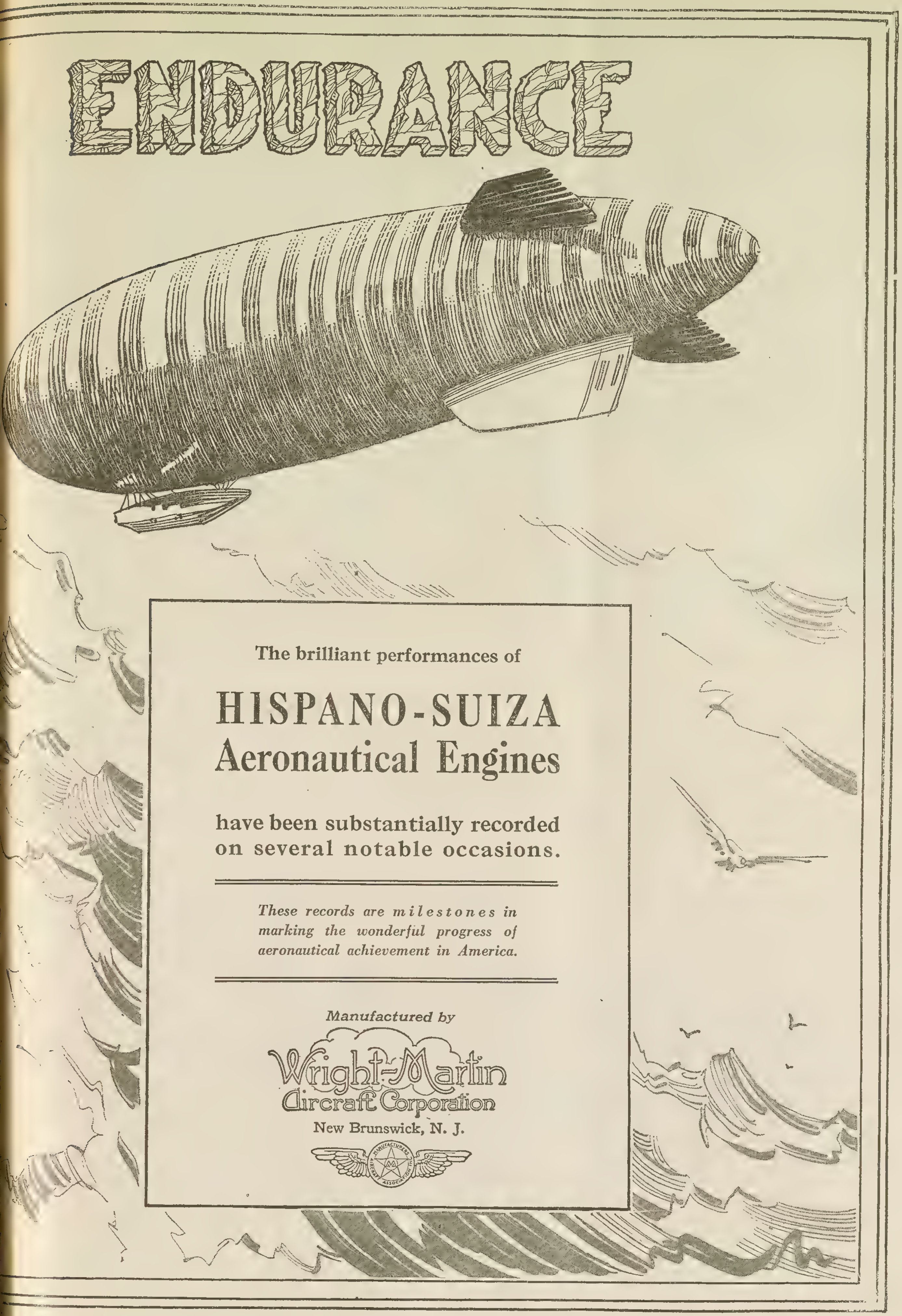
Airplanes	$319,000
Airplane equipment	679,887

These machines are L. W. F. equipment sold to the Czecho-Slovak Government.



300 H.P.

Hispano - Suiza Aeronautical Engine — Magneto End View



ENDURANCE

The brilliant performances of

HISPANO-SUIZA
Aeronautical Engines

have been substantially recorded on several notable occasions.

These records are milestones in marking the wonderful progress of aeronautical achievement in America.

Manufactured by

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Aircraft Corporation
New Brunswick, N. J.

PILOT MILLER'S FLIGHT

Representatives of the Air Mail Service of the Post Office Department were inclined to brag a bit on the night of March 28 over the fact that one of their machines, a Curtiss JN-4, piloted by John N. Miller, a former naval aviator, made the trip from Philadelphia to New York that afternoon despite the heavy gale which swept the Atlantic seaboard, and delivered its cargo.

It was the only successful trip, and Pilot Miller had all sorts of exciting experiences, but the experts of the Air Mail Service were willing to lay a wager that nobody but air mail men even made the attempt to get off the ground within the windswept area, and were calling attention to the fact that, not so very long ago, flying under such conditions would have been defined in any dictionary by the single word "suicide."

In Whirlpools of Air

Pilot Miller jumped his plane into the air at 2:30 o'clock, and a few seconds later was lost to sight in a whirl of snow. The wind was then blowing just over forty miles an hour, and for short periods during the trip it got as high as fifty-five miles. The gale played all sorts of pranks, and, according to reports heard from Miller and other pilots who were less successful, there were whirlpools of air and squalls that drove in every conceivable direction.

Miller's machine was tossed about at times like a ship on a heavy sea. It is figured out now that he arrived over Belmont Park, the landing field for New York, at 4 o'clock in the afternoon. Ground men there had been shooting off flares and other signals to guide the pilot, but Miller reports that he never got glimpses of them because of the snow storm which was raging over the field. The best that Miller could do, therefore, was to work out his position on his instruments. Finally he hit the ground 200 feet north of John C. Baker's place at Great Neck, L. I., about eight miles from Belmont Park.

FARMAN GOLIATH'S ALTITUDE RECORD

Big French Biplane Reaches a Ceiling of 20,000 Feet with a Big Load

The feat of a big French biplane on April 1 in reaching an altitude of more than 20,000 feet was accomplished under the handicap of a load comprising the pilot, Lieutenant Boussotrot; four passengers, and ballast representing eight others.

The record of 20,000 feet, officially determined, is a new one for a flight under such conditions.

Lieut. Boussotrot said after the flight that he could have reached an altitude of 25,000 feet, but that the steering gear of the airplane began to freeze and he preferred not to take the risk of its jamming.

[The machine probably is the Farman-Goliath which recently carried two pilots and fourteen passengers from Paris to London and return on Feb. 8, and the same load from Paris to Brussels and return on Feb. 11.—Ed.]

L-2 SHOWN IN BOSTON

In the Automobile Show in the Mechanics Building, Boston, there is one airplane, and it is the centre of attraction. It is a product of the Whittemore-Hamm Company of Saugus and Jamaica, being their latest model, the L-2.

Without doubt the next few months will see the L-2 frequently in action, when many Bostonians will be able to renew their acquaintance with the biplane.

Aircraft to Patrol Forests

Major Gen. Menoher, of the Army Air Service, has been instructed to prepare necessary equipment, personnel and other facilities, for experiments in co-operation with the Department of Agriculture, in use of aircraft for forest fire patrol work.

Answers to Correspondents

All bona fide inquiries will be answered by letter to the inquirer and included in these columns. Questions should be accompanied by stamped addressed envelopes.

Loening Monoplane Wing Struts

A. G. M.—The wing struts on the Loening Monoplane have a definite lifting section and contribute in a small measure to the sustentation of the plane.

Measuring an Airplane's Speed

F. S. P.—The speed at which an airplane is driven through the air is measured by an air-speed indicator. This consists of a tube placed out on the wings known as a Pitot tube. The pressure and suction acting on this tube are transmitted by suitable leads to a small indicating box, built somewhat like an aneroid barometer. The box contracts or expands under the action of these pressures and moves a dial.

In answer to the second question: When a surface meets the air it experiences two forces, one along the line of flight opposing forward motion, which is termed resistance or drag and has to be overcome by the thrust of the propeller; the other force acts perpendicularly to the line of flight and is termed lift; this is the force providing sustentation for the airplane.

Wing Correction Coefficient

E. S. W.—Correction coefficient for wing sections. These corrections can be found in Judge's Properties of Aerofoils.

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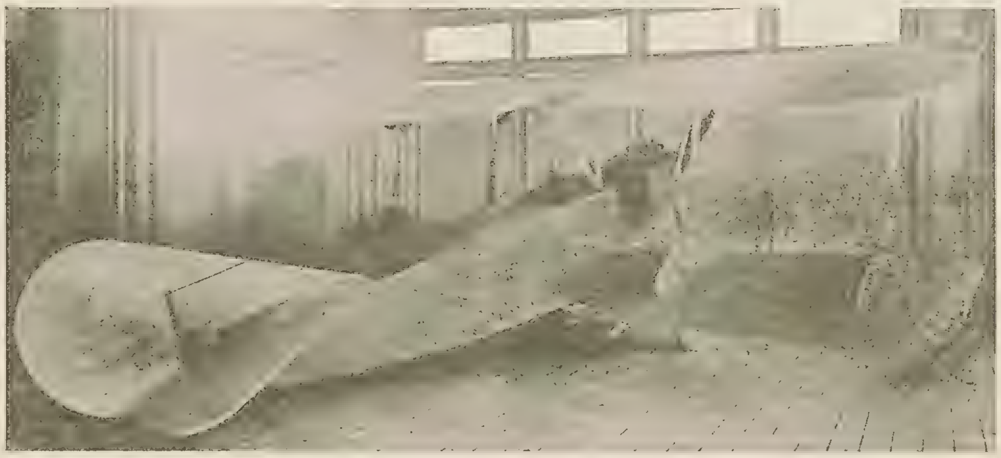

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AGES OF AMERICAN ACES

The following table shows the ages of the American officers (Aces) as of October, 1918:

	Born	Yrs. Mo.
Captain Edward V. Rickenbacker		28— 2
1st Lieut. Frank Luke, Jr. (Deceased)	5/19/97	21— 4
Major Victor Raoul Lufbery (Deceased)	3/21/85	33— 6
1st Lieut. David E. Putnam (Deceased)	12/10/98	19—10
Capt. Reed G. Landis	7/17/96	22— 2
1st Lieut. Fields Kinley	3/13/96	22— 6
1st Lieut. George A. Vaughn, Jr.	5/20/97	21— 4
1st Lieut. Jacques Michael Swaab	4/21/94	24— 5
1st Lieut. Thomas G. Cassady	1/ 5/96	22— 8
1st Lieut. Chester E. Wright	9/ 1/97	21— 1
1st Lieut. Wm. P. Erwin	10/18/95	23— 0
Capt. Elliott W. Springs	7/31/96	22— 2
1st Lieut. Henry R. Clay, Jr.	11/27/95	22—11
Major James A. Meissner	7/30/96	22— 2
Capt. Hamilton Coolidge (Deceased)	9/ 1/95	23— 1
Capt. G. DeFreest Larner	7/ 5/97	21— 2
1st Lieut. Paul Frank Baer	1/29/94	24— 8
1st Lieut. Frank O. D. Hunter	12/ 8/94	23— 9
1st Lieut. Wilbert Wallace White (Deceased)	5/ 1/89	29— 5
2nd Lieut. Clinton Jones	1/ 1/92	26— 8
Capt. Reid M. Chambers	8/18/94	24— 1
*1st Lieut. Harvey Wm. Cook		
1st Lieut. Lansing C. Holden	10/ 8/96	22— 0
1st Lieut. Karl Harold J. Schoen (Deceased)	10/20/94	24— 0
1st Lieut. Wendel A. Robertson	5/ 7/94	24— 4
1st Lieut. Leslie J. Rummell	2/21/95	23— 7
1st Lieut. Lloyd A. Hamilton (Deceased)	6/13/94	24— 3
1st Lieut. Jesse O. Creech	8/22/95	23— 1
2nd Lieut. Howard Burdick	2/18/98	20— 7
1st Lieut. Clayton L. Bissell	7/29/86	32— 2
Major Harold E. Hartney	4/19/88	30— 5
Capt. Douglas Campbell	6/ 7/96	22— 3
Capt. Jerry Cox Vasconcelles	12/ 3/92	25— 9
Capt. Edgar Gardner Tobin	7/ 9/97	21— 2
1st Lieut. E. P. Curtis	1/14/97	21— 9
*1st Lieut. Sumner Sewell		
1st Lieut. Ralph A. O'Neill	12/ 7/93	24— 9
1st Lieut. Donald Hudson	12/21/95	22— 9
1st Lieut. Murray K. Guthrie	3/29/96	22— 6
1st Lieut. William H. Stovall	2/18/95	23— 7
*1st Lieut. James D. Beane		
1st Lieut. Arthur R. Brooks	11/ 1/95	22—10
1st Lieut. Robert O. Lindsay	12/25/94	23— 9
1st Lieut. Martinus Stenseth	6/11/90	28— 3
2nd Lieut. Frank K. Hays	11/ 3/96	21—10
*1st Lieut. Howard C. Klotts		
Lieut. Col. William Thaw	8/10/93	25— 1
Major David McK. Peterson	7/ 2/94	24— 2
*Capt. H. R. Buckley		
*Major Charles J. Biddle		
1st Lieut. James Knowles	12/27/96	21— 9
1st Lieut. James A. Healey	3/26/93	25— 6
*1st Lieut. Innes Potter		
1st Lieut. Francis M. Simonds	10/17/94	24— 0
1st Lieut. Joseph Fritz Wehner (Deceased)	9/30/96	22— 1
1st Lieut. John J. Seerley	11/21/96	21—11
1st Lieut. Edward M. Haight	5/30/96	22— 7
1st Lieut. Harold H. George	9/14/92	26— 1
1st Lieut. George W. Furlow	3/24/93	25— 6
*1st Lieut. Arthur Easterbrook		
*1st Lieut. Byrne V. (E.) Bancom		
*2nd Lieut. Harold McArthur		
2nd Lieut. J. Sidney Owens	5/26/97	21— 4

AVERAGE AGE, 23 YEARS 7 MONTHS.

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* Data not yet received.

250 MILES IN 80 MINUTES

A new air record between London and Paris has just been established. A De Haviland machine of the official communication squadron, used by the Peace Conference delegates, March 28, flew the 250 miles in eighty minutes.

TO TRY OUT THE NEW BRITISH SUPER-TRIPLANE

Description Shows Departure from the Conventional Types of Aircraft

The trial flight of the most remarkable airplane yet designed in England will be made at Franborough, Hampshire, this month. The machine is a Tarrant super-triplane, which was briefly referred to by Major-General Seely in the House of Commons on March 13 when he foreshadowed a marvelous development of civilian aviation. The most striking feature of the plane is its long, cigar-shaped fuselage, similar in appearance to the body of a Zeppelin.

The machine was designed originally to bomb Berlin, for which it would carry 10,000 pounds of bombs and a crew of eight over a distance of 1,200 miles. It has a span of 141 ft., the fuselage is 85 ft. long, and it is fitted with six Napier Lion engines. It will be capable of carrying more than 100 passengers, or a cargo weighing four tons, for a distance of 1,200 miles, and by extra tankage it would be possible to make with it a non-stop flight lasting twenty-four hours, which means, roughly speaking distance of 2,000 miles under favorable conditions.

The fuselage is built of wood and strengthened by a patent system of girders not unlike the masts of an American warship, and this obviates the use of tracing wires and other fittings common to the ordinary airplane. There is free-way right down the center of the fuselage permitting any one to walk to the tail. Three rows of glass windows, giving the appearance of portholes, will be fitted inside of the triplane, and tiers of seats will be provided for passengers.

In addition to the staff of pilots there will be on board two or three engineers and mechanics, a navigator, and a wireless operator.

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COLLEGE POINT, L. I.

NEW YORK CITY'S POLICE AVIATORS

Sworn Into the Service of the City and Welcomed by Commissioner Richard F. Enright

The New York Police Department has taken active steps to form an aviation section of the Police Reserves under Deputy Commissioner Rodman Wanamaker. Col. Jefferson De Mont Thompson is in command of the air force.

The following fliers have been sworn into the service: Lieut. Paul Micelli, Edward L. Smith, James R. McCaffrey, Capt. S. Herbert Mapes, Lieut. Leigh J. Bair, Capt. Hugo Sunstedt, Capt. Joseph C. Stehlin, Lieut. Edmund C. Rowan, Lieut. John Robertson Hoyt, Lieut. Frank Sefern Ennis, Miles F. Kellin, Ensign Albert Pendleton Taliaferro, Jr., Ensign Frank E. Hutcheon, Charles Siems, Ensign J. G. Stewart, Charles S. Jones, and Lieut. Hilbert L. Bair.

Commissioner Enright made an address welcoming the men into the police fold.

"Things are moving very rapidly in the world to-day," he declared. "Instead of sending an infantry force into Hungary to subdue the revolt I understand they are thinking of sending airmen. Great advances have been made in the aviation industry in the past year or two of warfare.

"In my opinion, this is a most auspicious day for the police reserves and for the Police Department of New York. The day of the airman has indeed arrived—much sooner than anticipated.

"It was only twenty years ago that automobiles first made their appearance in the streets of New York, and only fifteen that they became a factor in the traffic. It is conceivable that within the next five years airplanes will be as thick in the skies above us as automobiles were five years ago in our streets.

"You are the advance guard of aviation and you have come to the right place. I am sure you will be useful."

PARIS AIR COMMISSION

The Aeronautical Commission of the Peace Conference held a meeting in Paris, March 31, to receive and consider reports from sub-committees concerning military, legal, commercial and technical subjects. It was found that the sub-committees had not completed their work, but the commission approved the temporary reports submitted.

It was agreed to put before the Supreme Council the proposals to be finally submitted at the next meeting by the joint military and legal subcommittee. Good progress has been reached on important points in connection with the future of commercial aviation.

At the next meeting of the Commission it is expected that the general principles and much of the detail of the inter-Allied Aerial Convention may be settled finally.

CAPT. CHAMBERLAIN'S CASE

The court-martial proceedings in the case of Capt. Edmund G. Chamberlain of San Antonio have brought to light many interesting facts regarding the remarkable exploit of the Marine officer. Major R. S. Maxwell, who commanded the Squadron from which Captain Chamberlain claims to have secured his machine, is reported as testifying that to his knowledge none of his machines was loaned to the American flier. The case will probably take a month to secure all the testimony.

ANTI-AIRCRAFT MEN

The 2d Anti-Aircraft Machine Gun Battalion has received a letter of commendation from Col. R. W. Collins, Chief Anti-Aircraft Service, First Army, A. E. F., giving praise for the success of the Battalion in downing enemy airplanes.

"This is to bear witness to the valuable service performed by the 2d Anti-Aircraft Machine Gun Battalion during the trying times of the Meuse-Argonne offensive. The units of this command, scattered along the front of three American corps attacking the strong German lines, many times found themselves in the very front lines and always conducted themselves, during their comparatively long period of front line work under frequent shell fire, in a most creditable manner.

"The record of seventeen enemy airplanes shot down by the battalion in the average period of one and a half months has not been equalled by any other organization, American or Allied, so far as the writer has been able to determine.

"Words of praise from any one cannot add to the record, which is an ineradicable evidence of faithful devotion to duty on the part of every member of the command."

PLANES TO CARRY FOOD

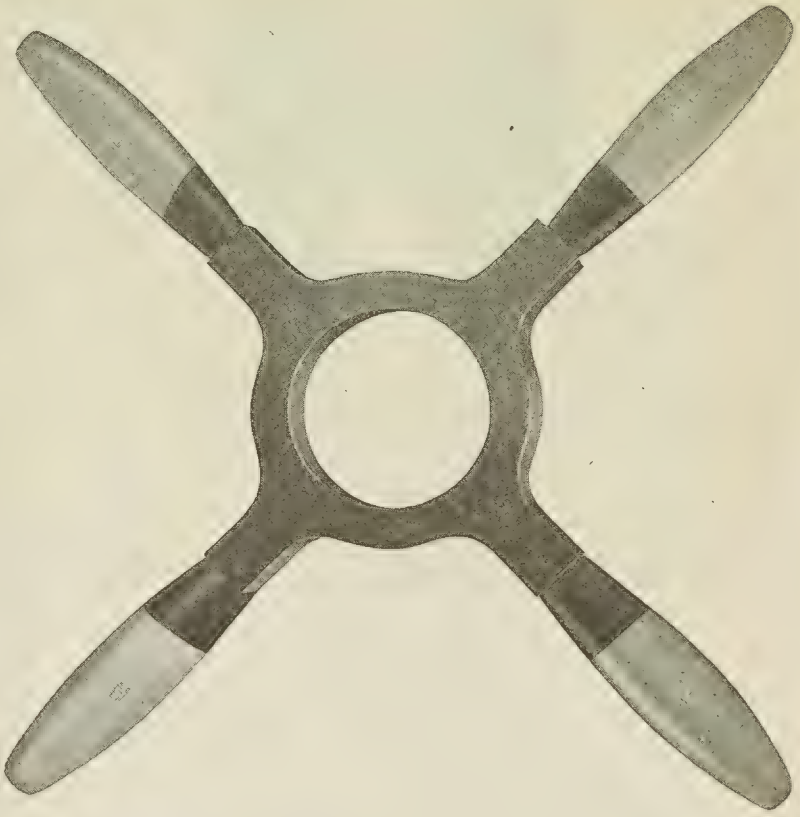
German bombing airplanes of the Friedrichshafen type, which were surrendered under a clause of the armistice, will be used by the Department of Civilian Aviation in transporting foodstuffs between Paris and Bordeaux. The airplanes will be equipped to carry three tons of parcels and bundles.

Before the end of the week the department plans to have in operation an aerial post between Paris and Valenciennes by way of Maubeuge.

Insist Upon Riding Behind Propellers of Proven Performance

You aviators know our propellers—many of you have ridden behind them—for we have been *designing and building* them for Gallaudet, Wright-Martin, Lewis & Vought, Standard and Loening.

Insist upon doing your flying behind Walnut Propellers from Piqua. We *design* as well as build propellers of proven performance — from the log to the finished propeller blade. Write for particulars.



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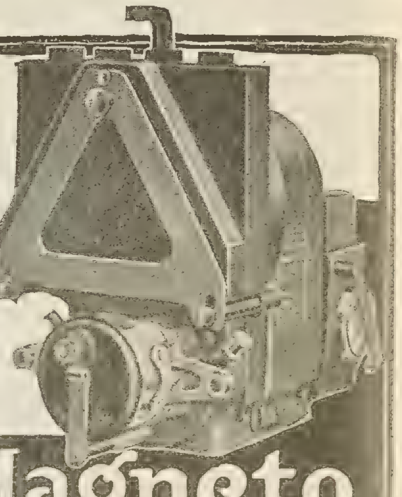
Half of the American airmen have proved the Berling's worth.



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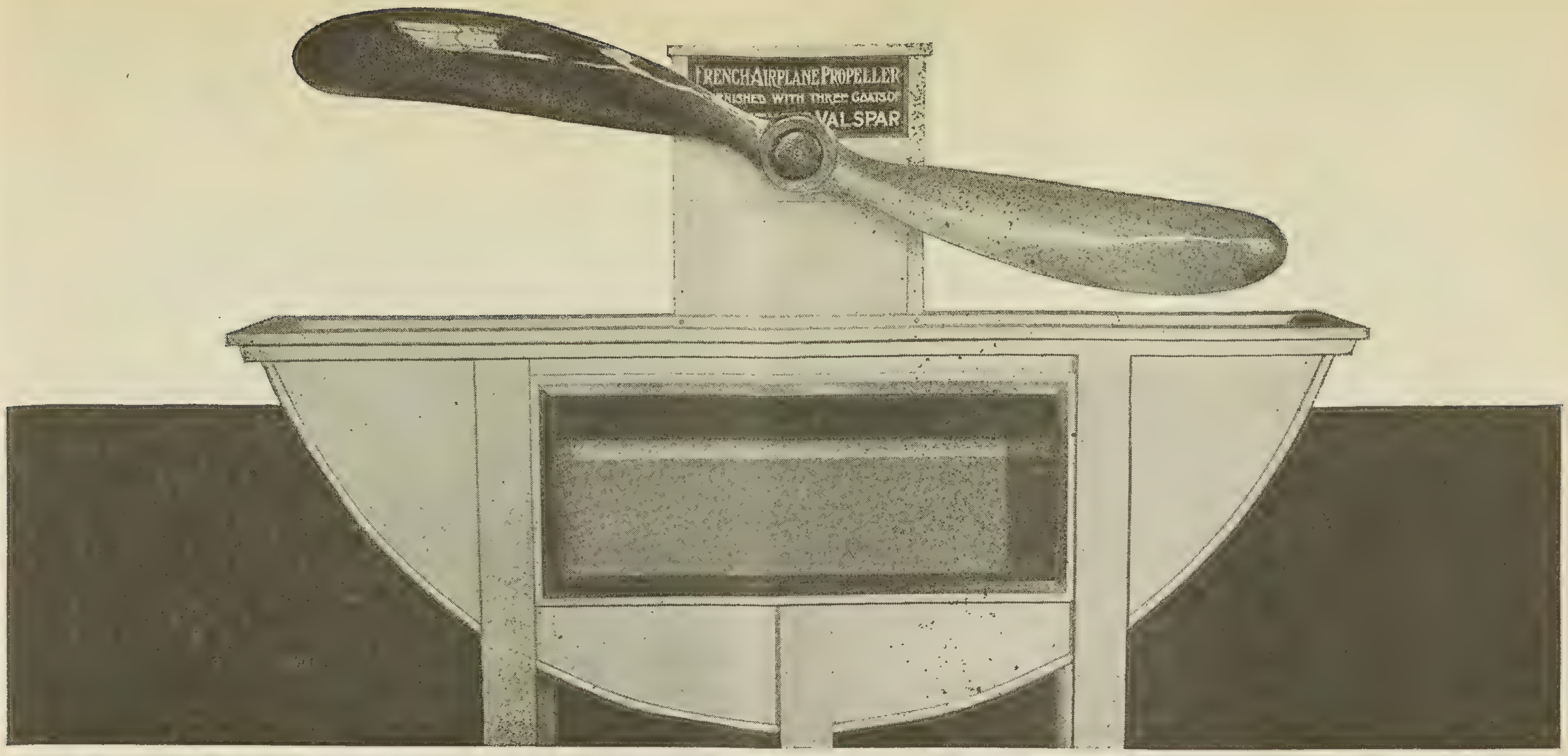

An Experiment they *Dared* us to make—

"Take a laminated airplane propeller; varnish it with Valspar; mount it so that the blades will pass through a tank of water at each revolution; hitch a motor to it; run it for a week."

That's what some varnish "sharps" dared us to do. They knew that this was one of the most severe tests that you could give a varnish to prove whether or not it was *absolutely* water-proof.

It is much more severe than an ordinary soaking test because the water pushes against the propeller blades, trying to drive through the varnish. If any water seeped through the varnish and got into the glue between the walnut strips, the propeller would promptly begin to go to pieces.

To these varnish "sharps" this was a *dare*; to us it was nothing more than a demonstration, because we knew that Valspar could stand *any* water test that might be suggested.

So we accepted their dare

We got a laminated French airplane propeller and gave it three coats of Valspar. Then we mounted it, as shown in the photograph above, geared to a motor so that it revolved continuously, the blades being exposed alternately to water and air at each revolution.

For *two years*, off and on, this propeller has revolved, forcing its way through the water. And nothing has happened!

The propeller blade not only looks as fresh and bright as it did the first day it started to revolve, but it looks as though the test could be continued for *years* without any possibility of the wood or the glue ever getting even damp!

Airplane engineers can readily understand the importance of this unusual water-proof quality of Valspar, for when driving through mist banks or through rain-storms, the impact of the water against the varnished surfaces of airplanes, and particularly the propeller, is *terrific*, and unless the varnish is *absolutely water-proof* and will positively prevent any moisture driving through it, there is danger of serious consequences.

TO Purchasing Agents and Superintendents of Production: Our airplane Department willingly places its experience at your disposal. We have a valuable book full of information on airplane finishing which we will be glad to hand you on request.

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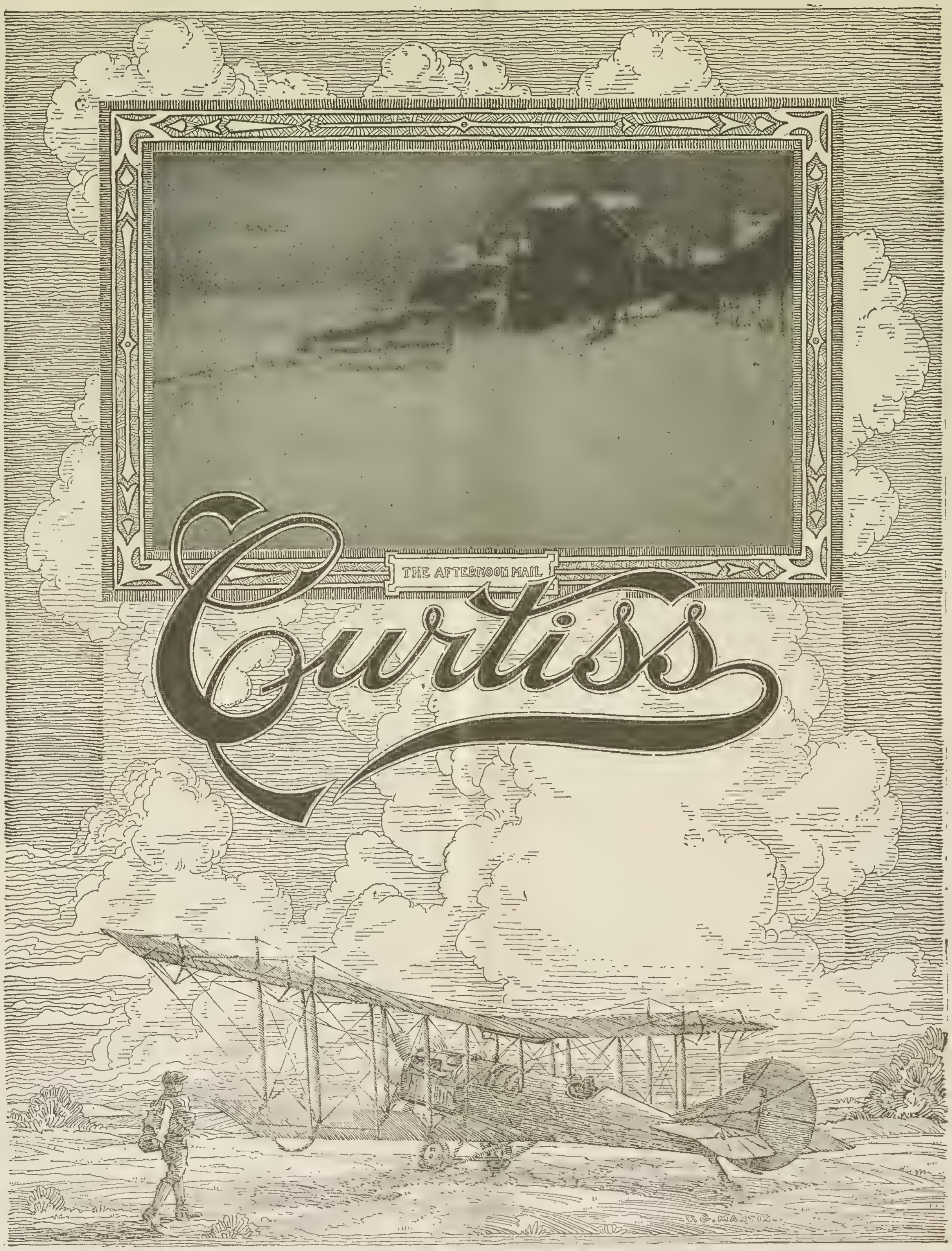

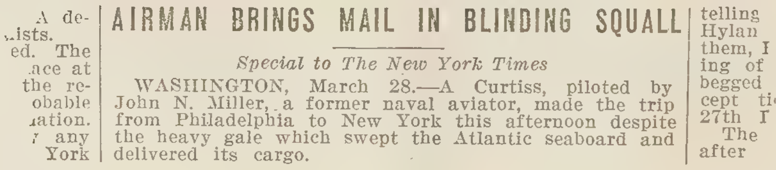

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AIRMAN BRINGS MAIL IN BLINDING SQUALL

Special to The New York Times

WASHINGTON, March 28.—A Curtiss, piloted by John N. Miller, a former naval aviator, made the trip from Philadelphia to New York this afternoon despite the heavy gale which swept the Atlantic seaboard and delivered its cargo.

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AIRCRAFT JOURNAL

Formerly Air Service Journal

The National Aeronautic Newspaper

VOL. IV. No. 15 NEW YORK, APRIL 12, 1919 PRICE 10 CENTS

Ludendorff's "Break Through" Air Tactics

Secret German Manual of Position Warfare for Air Forces—Translated from the Original

No more interesting official document relating to the world war has appeared in any American publication than the translation of the German Manual of Position Warfare for Air Forces herewith printed in AIRCRAFT JOURNAL. *It was issued by the chief of the General Staff of the German Field Army, General von Ludendorff, Jan.* 1, 1918, *but contains amendments dated Jan.* 26, 1918, *and July* 27, 1918. *The original is marked: "Not to be taken into the Front line"; "Secret" and "Distribution down to Battalions."*

As an example of German thoroughness in preparing troops for warfare the document as a whole (only the section relating to the Air Force being given here) is very impressive:

The best laid plans of Huns and men—

AIR FORCES—VI

81. Introductory—The following rules apply to *attacks on a large scale,* for which strong air forces of all types are indispensable; naturally they are also applicable to smaller attacks.

82. Principles to be observed when reinforcing the front—The appearance of strong air forces (aeroplanes, balloons and anti-aircraft guns) is for the enemy one of the surest signs of an impending attack. *The activity of the air forces must, therefore, be moderated during preparations.*

It is very difficult to insure an adequate engagement of aeroplanes while still observing the demands of secrecy, as reinforcements cannot be brought up till very late. By frequently exchanging aircraft units, by attaching aviators to the reconnaissance and protective flights already present on the front of attack, and by forming instructional centers behind the front, an attempt must be made to insure that the flying personnel possesses the necessary knowledge of the country on the front of attack without premature transference of forces. Flying at the front must be co-ordinated so that, on the one hand, it will be difficult for the enemy to detect reinforcement, and that, on the other, the aviators are given sufficient opportunity for learning the country.

In any case, *complete photographic reconnaissance,* with no gaps, must be insured. This is of decisive importance. Next in importance is the necessity of familiarizing artillery, infantry and battle aviators with the ground. The main reinforcements in pursuit and protective flights can be brought up last.

The distribution among the attacking divisions of reconnaissance flights and of units detailed for battle flying must be carried out sufficiently early to enable them to take part behind the front (as far back as possible) in the practice attacks of their divisions. Practice in mutual co-operation is indispensable.

The bringing up, housing and work of balloons and of anti-aircraft guns are governed by the same principles.

83. Measure of Security—*Aerodromes constructed beforehand* during quiet periods, with permanent sheds and huts, are of great value, as the erection of new hangars, etc., shortly before an attack would betray the concentration of aircraft. In newly occupied aerodromes, machines and lorries must not be left outside the sheds. If there is not sufficient accommodation for all the machines, it may be necessary to dismantle some of them. Flights accommodated in hangars may at first erect only a portion of the hangars, and must, as far as possible, conceal them from observation.

84. Method of screening preparations—In no case must an attempt be made to conceal preparations by means of strong *defensive patrols,* as the enemy can break through them, no matter how strong. Small but vigilant formations of scouts, ready to attack at any opportunity, must be used at high altitudes, and, if necessary, at two levels. They must keep well back and to the flanks of the sector to be protected. The presence of hostile airmen will be pointed out to them by directional rounds from anti-aircraft guns and by large direction signals on the ground.

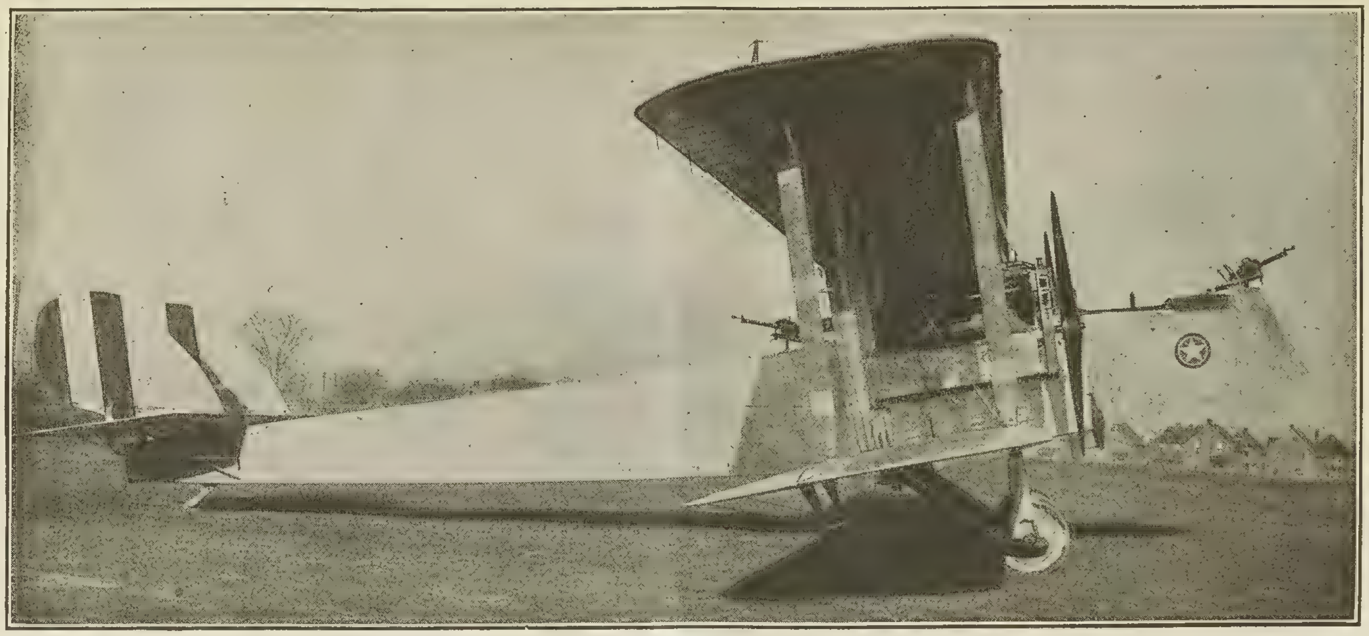
85. Sketches and maps—Situation sketches for new aircraft formations and attacking troops must be prepared in large numbers from the latest photographs.

Maps must be prepared showing dropping stations for messages, distribution of fire zones, and areas over which little or no ground observation is possible; in addition, sketch maps are required for contact patrol reports.

86. The allotment of wave lengths and call signs for aeroplanes and wireless stations requires very careful handling, as the enemy will necessarily have his attention attracted at once to an increase in strength by the use of new call signs. If it is impossible to avoid introducing new call signs, they must be allotted to the stations which are least in use or are more difficult for the enemy to overhear.

87. Air forces to be held back—*Even* during artillery registration, and after fire for effect has commenced, it is advisable to hold back the air

(*Continued on page* 9)



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Committees on Aeronautics Needed

THAT the Navy and Army are now engaged in preparing new plans for the future in connection with their Air Services, to present to Congress when it convenes, is well known.

There are also being worked out plans by Congressmen for the development of a separate air service which will receive serious consideration at the hearings which are to take place.

The most essential step to be taken immediately after the opening of the session is to secure the appointment of Committees on Aeronautic Affairs which will have on them Congressmen who take an interest in the work of the Air Services. With such committees, all plans would receive a more intelligent hearing than under the present plan of laying all facts before Military and Naval Committees of both houses.

That programs emphasizing the advisability of an independent Air Service will be submitted is certain. These should receive the most careful consideration wholly independent of military or naval bias. To accomplish this purpose, committees entirely separate from the present should be appointed. The future of the Air Service is too important to be handled without the most expert opinion obtainable.

Air Service Tactics

THE publication of the German General Staff manual for the employment of Air Forces in the decisive attack in large scale warfare in this issue, gives the first official glimpse to the American public of the tactical methods for the employment of air troops which were actually used on the western front.

The significance of the document lies primarily in the intimate liaison and authoritative common command of air and ground troops. This common command is taken for granted and every move in the employment of air troops is based upon and contingent upon some action by the ground troops—artillery or infantry.

Nothing could be more striking than the contrast between the attitude of mind that looks upon the Air Service as an arm which by its sole independent action can bring defeat to the enemy—and the cold military manual prepared by the German General Staff and employed with such startling effect on March 21 and again on May 27, 1918.

Ludendorff made his bid for success a year ago, founding all his actions upon the sound tactical principles that man fears man more than he does the chance action of steel and lead and that the infantry is today, as much as ever, " The Queen of Battles." The measure of usefulness of all the other arms and services was judged by their ability to help the infantry to destroy its enemy's moralé. How close Ludendorff came to success it is doubtful if the United States will ever realize. Beginning on July 18, 1918, Marshal Foch commenced the pitiless, unintermitted counterattacks which brought success. The employment of the Air Service Units, French, English and American from July to November was, generally speaking, in accordance with the plan laid down in the Ludendorff manual.

The eight squadrons of the British Independent Air Force under General Trenchard alone did not conform to these principles. This force was engaged in carrying out reprisal raids upon German Rhine towns for the sake of the moral effect which these reprisal raids had in raising the moralé of the British civil population. In September this force cooperated with the American attacks at St. Mihiel on September 12 and in the Argonne-Meuse area on September 26, but the force was not commanded by Marshal Foch, and in principle did not as a general rule attempt to influence decisive battles either in the air or on the ground. That the existence of a military force in France capable of assisting the infantry in any degree and yet employed for other purposes was a mistake is the practically unanimous military opinion.

It is, therefore, significant to find that the plans for an American Air Service which were announced from Washington last week are based upon sound tactical axioms. The size of the Air Service is to be commensurate with the size of the army. The Air Service is recognized as being the essential fourth combatant arm—a part of the army whose employment must be studied and provided for by the higher staffs as carefully as they have heretofore studied and provided for the employment of the Infantry, Cavalry and Artillery.

Brighter Days Approaching

IT requires business courage as well as business brains to enable a country to pass successfully through a period of reconstruction. America has both.

Added to the confusion which confronts business in general, however, the aircraft industry faced the further handicap of having to wholly readjust itself to peace conditions, owing to the fact that for seventeen months prior to the signing of the armistice its every energy and endeavor were applied exclusively to the manufacture of military machines. With the cessation of hostilities came a period of Government inertia, and the cheerless winter months contributed their quota to a situation beset by perplexities.

Fortunately the leading men in commercial aeronautics believe in the French axiom: " If it is possible it is done. If it is impossible let's do it."

And now, with winter making its final gasp, the men who directed and the men who fought in our air forces in France are back to tell us what should be done to establish the United States upon an aviation basis at least the equal of that of any other country. With a voice unanimous they say our military, naval and marine air establishments must be maintained if the defense of America is to be adequately safeguarded. They speak with the voice of experience and authority. Not to heed the advice would be worse than negligent. It would be criminal. Fortunately indications in Washington point to a realization of its importance.

With the approach of pleasant flying weather and the beginning of sport and pleasure flying, long held in restraint by the war, and the inauguration of new air mail routes by the Post Office Department the next month promises to unfold a vista of prosperity to the world aeronautic.

Atlanta Given a Landing Field by Asa G. Candler

Example Set by the Eminent Georgian Could Well Be Followed by Holders of Suitable Lands in Other States—Actual Work Will Soon Be Begun

Atlanta, the metropolis of the South, through the generosity of one of her leading citizens, Asa G. Candler, has been placed on the aviation map. He has donated for an indefinite period the old Speedway site as a landing field, and an Air Service officer will be assigned to cooperate with Fulton County engineers in preparing the site for landing purposes.

Senators Smith and Hardwick speak enthusiastically of Mr. Candler's notable service to his city and to aviation, and, inferentially at least, suggest that the example set by him could well be followed by holders of suitable lands in other cities and states. The story is told by the Atlanta Journal, once owned and edited by Senator Smith:

It is up to every city and town in Georgia to follow the initiative of Atlanta and get a place on the air map of America by providing satisfactory landing sites for airplanes of every kind and character, in the opinion of Senator Hoke Smith.

As a member of the senate military committee, Senator Smith is in sympathy with the development of aeronautics, both from a military and commercial standpoint, and on April 1 he expressed appreciation of the generous contribution of Asa G. Candler in donating for an indefinite period the old Speedway site as an aviation landing for Atlanta.

As announced in the Sunday *Journal*, this double-barreled landing will conform to the recommendations and suggestions of Colonel Townsend F. Dodd, of the United States Army Air Service, who came to Atlanta at the request of the *Journal* to inspect the proposed landing site.

Jumped None Too Soon

Colonel Dodd not only placed his stamp of approval on the site, but also advised with members of the county commission concerning the outlines and character of the landing. And at Colonel Dodd's suggestion, an officer from Souther Field will confer and advise with the county officers in the actual preparation of the site.

Although, as Colonel Dodd pointed out Saturday, Atlanta is getting "the jump on most other cities in the matter of airplane landings," the fact is that Atlanta "jumped" none too soon. The generosity of Mr. Candler, the assistance of the county commission, the manifestation of interest by the army air service and the initiative of the *Journal* combined at the psychological moment to accept an opportunity that was knocking at Atlanta's door, but that was almost unheard and unheeded in the turmoil of bustling business activity.

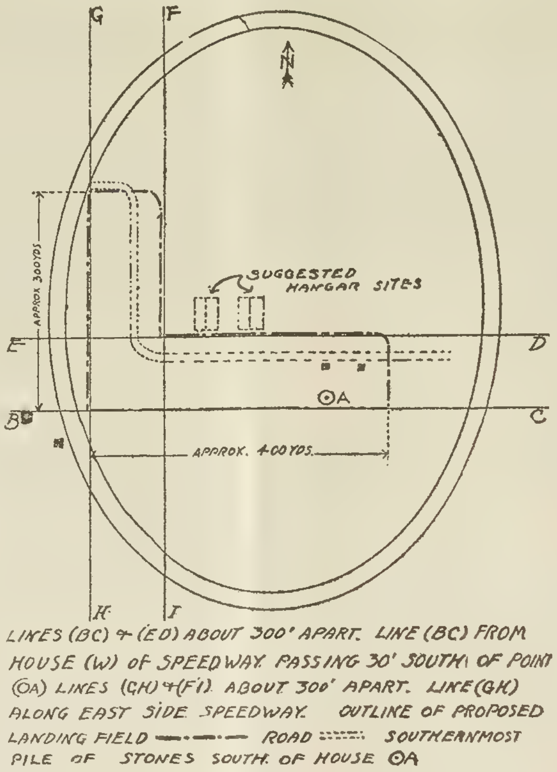
Boston-Atlanta Route

With the completion of arrangements for the establishment of a suitable landing, for the safe accommodation of any and every sort of plane, comes the announcement that the postoffice department has in preparation a plan for the establishment of an aerial mail route from Boston to Atlanta, via New York, Philadelphia, Baltimore, Washington and Richmond.

And on top of this comes the appeal of Senator Smith for other cities and towns in Georgia to follow Atlanta's initiative and arrange airplane landings so they may be able to avail themselves of possible extensions of the aerial mail route from Atlanta, and to improve the opportunity to enjoy the benefits of the development of the airplane as a commercial asset.

Senator Hardwick's Statement

Former Senator Thomas W. Hardwick, who served as a member of the postoffice committee of the senate during the recent session of congress, recently recalled that officials of the postoffice department assured the senate that an appropriation for aerial mail contemplated a route from Boston to Atlanta.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THE ASA G. CANDLER AIRPLANE LANDING FIELD

All sorts of planes, from the speediest pursuit machines to the heaviest night bombers, will be afforded safe landing on a twin "L"-shaped field on the old speedway site, donated by Asa G. Candler. This reproduction was made from a pencil drawing by Colonel Townsend F. Dodd, United States Army Air Service.

"The hearings on the postal appropriation bill contain reiterated statements by Assistant Postmaster General Praeger that a part of the fund that the senate allowed would be used to establish an aerial mail route from Boston to Atlanta," said Mr. Hardwick. "Indeed, Mr. Praeger stated that if only one additional route was established it would run from Boston to Atlanta. He regarded this as the logical course for the development of the airplane as a means for transportation of fast mail."

Mr. Candler Appreciated

Senator Smith was enthusiastic in his reception of the announcement of the *Journal* that all obstacles in the way of an airplane landing had been removed.

"I read the announcement with pride and gratification," said the senator. "Mr. Candler again has rendered a notable service to the city of Atlanta. His generosity in donating the use of the old Speedway positively assures that Atlanta soon will be the southern terminus of an aerial mail route from Boston, via New York, Philadelphia, Baltimore, Washington and Richmond. The congress at its last session made provisions for the extension of the aerial mail service, and it was understood distinctly that one of the proposed routes would extend from Boston to Atlanta.

"While I realize that the twin landing at the old Speedway insures beyond a peradventure the establishment of this mail route, I welcome Mr. Candler's generosity for other reasons. The airplane is here to stay. Indeed, its development is in its infancy, despite the remarkable feats it already has performed. But the airplane is going to be developed as a commercial asset, a means of rapid transit that will annihilate distances in this country, and the city or town that doesn't afford a depot for these machines is doomed to lag and languish.

Senator Smith's Enthusiasm

"It is my desire, therefore, to urge upon every community in Georgia to follow Atlanta's initiative, to the end that they may be ready to enjoy the benefits that must come from the development of aviation in this country.

"It should be remembered in this connection that Souther Field at Americus has been decided upon by the war department as a permanent training field for aviation, and it follows, therefore, that this section will be at all times abreast with the development of this new and novel means of transportation.

"It is well enough to consider, furthermore, that the army realizes and appreciates the potentiality of the airplane as a military instrument, and it may be accepted that the strides already noted in the art of flying, remarkable though they are, in fact, only a slight step forward in the development of aeronautics.

"The airplane, as a military instrument, in my judgment, will represent an essential part of the nucleus of the military establishment which sound sense and judgment demand the United States shall maintain during the unsettled and uncertain times now prevailing, League of Nations or no League of Nations."

Minor Details to Be Arranged

Only a few minor details remain to be arranged before actual work is undertaken by the county commission in transforming the Speedway oval into an L-shaped airplane landing in conformance with the plans and recommendation of Colonel Dodd. Upon his arrival in Washington, Colonel Dodd will arrange to have an officer from Souther Field assigned temporarily to Atlanta to co-operate with the county engineers in the preparation of the field.

Pulitzer Aviation Trophy

Stimulus will be given aviation in this country as a result of the aerial derby, the first competition for a trophy offered by Ralph Pulitzer, Joseph Pulitzer, Jr., and Herbert Pulitzer, owners of the New York *World* and the St. Louis *Post-Dispatch*, which has just been announced.

The Pulitzer prize is a challenge trophy to be competed for annually in an event to be selected each year by the Aero Club. All aviators are eligible and the trophy must be won three times before it becomes the permanent possession of any competitor, the year's winner holding the trophy until the next contest.

The first competition is to be held in connection with the one-month aeronautic convention and exhibition at Atlantic City, beginning May 1, when the Pulitzer trophy will be awarded the aviator who covers the longest distance in a non-stop flight in cross-country flying over land or over water or both in flying from or to Atlantic City.

The fact that the Pulitzer competition is open to airplanes of any type, as well as any number of motors with which the 'plane is equipped, makes it possible for every class of airplane to be flown to the full extent of its capacity.

Competitors may make as many attempts to win the trophy as they wish, the only restriction being that they be made during the month of May and are from or to Atlantic City.

French Aviator Starts Flight to South America

Short Bros. and Sopwith Plan for Their Planes to Start About April 16, the First Named from Ireland—United States Navy Preparations

Lieutenant Fontan, French aviator, started at 6 a. m., April 8, from Villa Coublay, near Versailles, France, on the first leg of a trans-Atlantic flight to Brazil.

He will make his first stop at Casablanca.

Fontan's flight would be made in five legs, totaling 5500 miles, as follows:

Villa Coublay to Casablanca (Dar el Beda), 1200 miles; Casablanca to Dakar, 1400 miles; Dakar to St. Paul Rocks, 1000 miles; St. Paul Rocks to Pernambuco 750 miles; Pernambuco to Rio Janeiro, 1100 miles.

Casablanca is in Morocco, on the Atlantic coast, about 100 miles southwest of Gibraltar. Dakar is at the extreme end of Cape Verde. St. Paul Rocks are in the South Atlantic, northeast of Pernambuco.

Fontan made an attempt to follow this route on March 16, but was forced to descend at Blois because of engine trouble after having been in the air less than two hours.

The Aerial Service Paris-Brussels

By FARMAN.

The **FARMAN** firm will start its regular aerial passenger service with the aeroplane "**GOLIATH**," between **PARIS** and **BRUSSELS**, from March 22. Departures will be, provisionally, made weekly.

Leave TOUSSUS-LE-NOBLE (Buc), near Versailles, Saturday, at 9 a.m.
Arrive BRUSSELS, at 11.45 a.m.
Leave BRUSSELS, Monday, at 3 p.m.
Arrive TOUSSUS-LE-NOBLE, at 5.45 p.m.

The fare for each journey is fixed at 365 francs.
Passengers must have properly signed passports with them. **MM. FARMAN** will furnish the necessary information on this important point.

Always book in advance at **FARMAN'S** (service des voyages), 167, Rue de Silly, **BILLANCOURT (Seine)**. Telephone: **AUTEUIL 09.98.**

The first advertisement in a newspaper of an international air route appeared in the Paris edition of the London Daily Mail of March 13, 1919. *The fare of* $73, *and the time of flight, two hours and forty-five minutes, are not the least interesting parts of the announcement.*

British Activities

Advices from London state that the airplane of the Short Brothers will start from Ireland for Newfoundland on April 16, weather permitting. The machine is expected to make the journey in twenty hours.

It is understood this machine will leave the ground somewhere near Limerick. The ship is called the Short "Shiel" airplane. It is fitted with a 375 h.p. Rolls-Royce engine developing a speed of ninety-five miles an hour.

In their application to the British Air Ministry the Shorts designated Major James C. P. Wood of the Royal Flying Corps as pilot, with Captain C. C. Wylie, a nephew of the marine painter, as navigator.

Bad Weather at St. Johns

A despatch from St. Johns, N. F., contains the information that the work of rigging the Sopwith airplane in which Harry G. Hawker and Lieutenant Commander Mackenzie Grieve, British aviators, are to attempt a flight across the Atlantic, was practically completed April 7, except for the installation of the wireless equipment, which may take three or four days.

The machine will be taken up for a trial flight, and if the engines and gear are working satisfactorily the journey to Ireland will begin early next week, provided the ground is in good condition for a start.

The weather continues discouraging, sleety rain is still soaking the ground and rendering any movement around the hangar impossible. Every day's continuance of these conditions means further postponement of the start.

Meanwhile the Sopwith party are much concerned over the impending arrival of the Martinsyde machine, due there at the end of the week. The Martinsyde people will house their machine in a tent, and under the spur of the advantage of the Sopwith delay, both flights may be brought off about the same time.

Capt. C. W. F. Morgan, navigator of the Martinsyde, is expected at St. Johns this week.

Dubious About Success

Newfoundland airmen who served on the Western front and who have returned here are dubious about the success of either of these machines, because of their small size and the strain upon the physical and mental powers of only two occupants of a machine on a twenty-hour flight across the Atlantic under conditions in which no satisfactory navigation knowledge is possible, and the liability to storms also is great, owing to absolute ignorance of meteorological conditions in that area. These fliers are more hopeful of success by the large Handley Page or Porte machines, which will attempt the Atlantic flight a month or two later. The Sopwith people, however, are confident and are only worried over the adverse weather conditions.

The meteorological expert maintained here by British authorities is getting about forty messages daily from ships all over the Atlantic and from coast points in Canada and the United States to assist him in making his predictions as to when and under what conditions the flight should be started. Everything points now to the attempt being made with the new moon, about April 16, if the ground is firm enough. The start is scheduled for 2 a. m., to be completed within nineteen hours.

U. S. N. Preparations

While the British entrants are working with feverish haste the preparations for the flight by the United States Navy with one or more of the N C type of boats are proceeding actively, but with no appearance of undue haste.

If the weather is propitious it is probable that a test flight of the NC-2 may take place off Rockaway soon after this issue of AIRCRAFT JOURNAL leaves the press.

Lieut.-Comdr. Harold W. Scofield, U. S. N., serving as aid to the Commandant at New York, has been selected as liaison officer between the public and the Naval Air Service. Commander Stanley D. Parker, commanding the air station at Rockaway, deals with routine matters connected with publicity.

It is probable that representatives of the press and photographers, as well as motion picture operators, will be permitted to be present at one of the trial flights of the N C-2, but there will be no "close ups." At least two of the three new NC's will be equipped with four 400 h.p. engines.

Commander J. H. Towers, in charge of preparations for the flight, is in New York, and there is no little stir in naval circles around the metropolitan district.

Flame and Smoke Flares

Flame and smoke flares developed during the war and improved recently by chemical experts of the Army will be factors in the flight. By dropping these flares at intervals the aviators will be able to determine the drift of their planes in the cross winds and make the correction necessary to keep them on their course.

Commander Towers explained the flares would be in the shape of bombs which, upon striking the water, would give off flame and smoke, the one visible for long distances at night and the other by day. The flares would remain virtually stationary on the water and thereby indicate the angle at which the machines were being driven from a straight line.

This is only one of the many details which officers in charge of the plans for the flight have had to work out. Special devices have been necessary in each case and this in a measure accounts for the length of time consumed in making ready for the start.

Numerous experiments with the planes themselves also have been necessary. Not even a tentative date for leaving Rockaway Beach, L. I., on the 1,200 mile flight to the "jumping off" place in Newfoundland has been selected. At least one stop will be made between those two points.

The destroyer Barney, which is cruising along the north Atlantic coast to select possible landing places for the machines as well as a suitable starting point for the overseas voyage, now is en route to Newfoundland from Halifax. On the first attempt to reach the former place the vessel was held up by ice floes and at the Navy Department no information had been received as to the success of the second attempt.

New Trans-Atlantic Type

Announcement has been made by Dr. William Whitney Christmas, President of the Cantilever Aero Company, that his organization will immediately commence building two aeroplanes for trans-oceanic flights. The Cantilever Aero Company has been building the well-known strutless and flexible wing aeroplane known as the "Bullet."

In his new design, Dr. Christmas plans to built aeroplanes of the biplane type having the following specifications: Span of upper wings 180 feet; span of lower wings 90 feet; chord of upper wing 24 feet; chord of lower wing 12 feet; total lifting surface 5000 sq. feet; lifting capacity 57,000 lbs.; number of motors 4 m.; r.p.m. motors 600; overall height 24 feet; propellers 3 bladed—21 feet diameter.

Dr. Christmas, in commenting on the special feature of design, said:

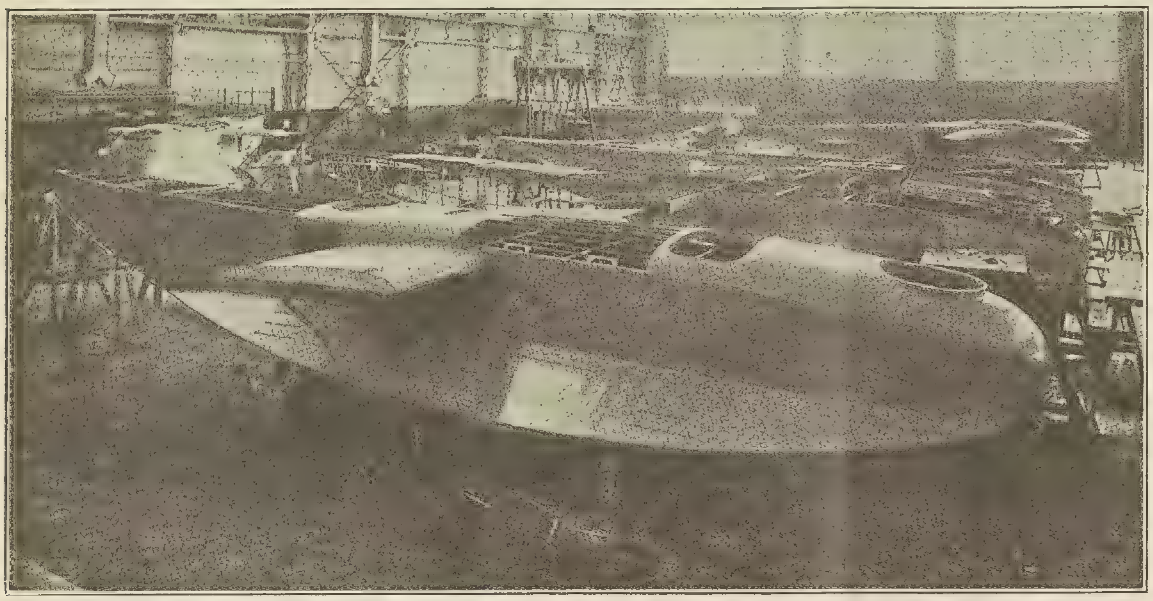
"This aeroplane will have a wing spread of 180 feet, with a surface area of 5000 sq. ft. The motive power of the machine will consist of four motors of 800 hp. each, which, while they are a collective unit, can also be run independently. This allows adjustments or temporary repairs. While the 3200 hp. to be thus obtained by the 4 motors is more than the amount needed, it can be split up into such units of power that there will be no danger on account of engine trouble. This aeroplane will be of the biplane type.

"The lifting capacity of this trans-Atlantic flyer figures 57,000 lbs., which includes dead weight of ship and supplies as well as passengers. Thus the ship will be able to carry a large amount of fuel for passage. This fuel can be greatly conserved by utilizing only half the motive power after sufficient altitude is obtained. This ship has a high gliding characteristic.

Notes on Technical Aeronautics

Flying Boat Hull Construction

One of the most difficult points in the construction of the flying boat is the hull. The Navy F-5-L furnishes a very interesting example of a good flying boat hull. This is a twin Liberty-engined tractor biplane and the hull measures 45 feet in length and 10 feet in width, the gross weight of the machine being 7 tons. The complete hull assembly is shown in the photograph and drawings.



Hull of the Navy F-5-L

The hull is built up around four longerons as is a land plane, and has in addition a keel and planked V-bottom that is flared to present more landing surface. The flared out portions are called fins, and in this plane are an integral part of the hull structure, are continued aft and are streamlined into the hull sides.

In hull construction a number of special terms are employed which we shall summarize before entering into the description proper.

Keelson—a wide thin plank extending from near the bow to the stern above the keel.

Keel—the bottom-most longitudinal member forming the backbone of the hull.

Floor-frames—the transverse planks jointed at right angles to the keelson.

Longerons—all longitudinal members extending from the bow to the stern with the exception of the keel.

Fin edges—the two outside longitudinals of the fins.

Stringers—the longitudinal strips connecting the floor frames on the bottom and the strips on the fins.

Bulkheads—all transverse veneer structures dividing the hull framing.

Transverse bracing—the central structure connecting the hull to the two wing beams extending through the hull.

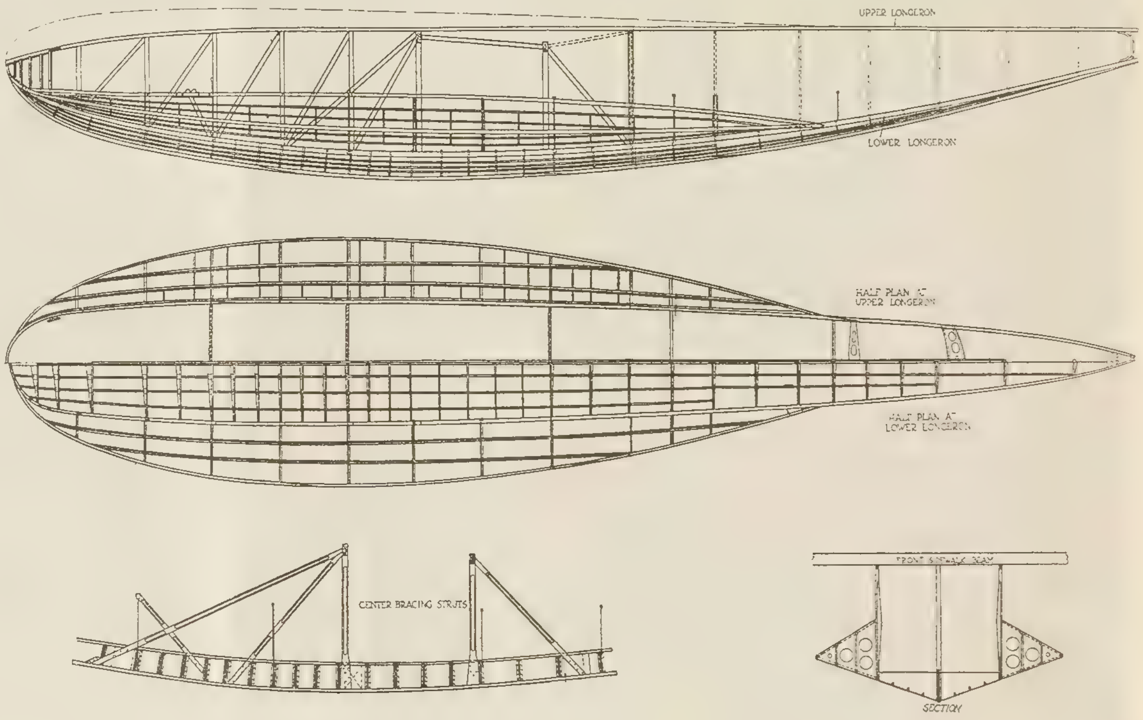
The keelsons are ½ inch basswood built in not more than 5 sections, having at least a 9 inch scarf at the joints and held together with copper rivets. To this the floor frames, also ½ inch basswood are notched and securely riveted by two comer stringers. Throughout it will be noted that built-up members are used permitting the use of readily available material.

White ash is used for keel, longerons, fin edges and the bent ends of the stringers. These two may be built up or spliced, but not more than four sections may be used. The scarfs in the keel must be at least 18 inches long and are copper riveted. In splicing the longerons, fin edges and stringers, joints are served and doped. Care is taken in the location of all splices in longitudinal members, so that a number of splices will not occur in the same section, causing a weak section and failure. For example not more than two longeron splices may appear in any one bay.

By splicing ash longitudinals and the careful location of joints, short lengths of ash may be used.

All ash members are steam bent to assembly shape before assembly on the hull forms. This bending and splicing of the complete longitudinals are done in a separate part of the shops. Likewise the keelsons and floor frames, stringers, bulkheads, posts, struts, braces, etc. are sub-assembled and when delivered to the hull-erection floor are ready for assembly but with little fitting.

All parts of the hull are connected with fittings of low carbon steel as aiding increased production, being easy to procure and easily welded or brazed with less loss of strength.



Assembly of the Navy F-5-L Hull

Another feature of the construction is the extensive use of steel tubing as struts and posts in the body bracing.

The central or transverse bracing unit is a complete unit in itself and is set up as a separate assembly previous to installation in the hull. The transverse bracing connects the hull to the wings and the hull may be said to be built around this unit.

The bottom planking comprises an inner and outer skin, each of 7/32 inch cedar. The inner skin is placed at right angles to the keel, acting as a strength member. The outer planking is placed at an angle of 45 degrees to the keel, in pieces of 4 to 5 inches width of Spanish cedar, screwed to the longitudinals. The two layers of planking are secured together by brass cinch nails.

Courtrai, a special fabric, is laid in marine glue between the two layers of planking and is used extensively in rendering all joints tight. All planking is laid with a slight clearance to allow a go-and-come resulting from moisture changes.

The bottom steps are secured in place after the hull is planked. There are two layers of 7/32 inch mahogany planking, fabric and marine glue between, screwed and clinched together, and secured to the hull bottom by copper rivets.

Veneer is used extensively throughout the balance of the hull covering. This comprises the top fin edge planking, the nose planking and the side planking.—(*Automotive Industries, March 27, 1919.*)

Ensign Finch Beat the Pigeon

A pigeon carried a message from a navy flier who had been forced down off shore to Atlantic City last week. The message read:

"Down ten miles west of submarine chaser at 4:15 p. m. No gas.

"ENSIGN FINCH."

Submarine chasers were sent out from the Cape May station and the Ensign with his seaplane was picked up by searchlights and towed home.

This was the first story. Later it was learned that the Ensign reached shore fifteen hours before the pigeon.

News of the Army and Navy Air Services

Liberty Loan “Circuses”

Three flying “circuses” of aviators will tour the United States giving sham battles in the air and performing acrobatics over the principal cities as a feature of the Victory Loan campaign, which opens on April 21.

This announcement is authorized by the Treasury Department. The tour is intended to present the “greatest flying program” ever offered in the United States.

The three “circuses” will be composed of American, French and British aviators. They will fly American planes and captured German Fokkers. Frank R. Wilson, Director of Publicity for the loan, will have charge of the aerial tours.

The actual flights will be under the direction of the Military Aeronautic Branch of the War Department, with Capt. Leon Richardson in charge. The country has been divided into three sections for the Victory Loan flights, Eastern, Middle-Western, and Western. A squadron made up of American, French and British fliers will tour each of these three districts.

The Eastern tour began at Mineola, L. I.; the Middle-Western tour at New Orleans, and the far Western tour at San Diego.

Each squadron will be carried in a special train of eleven cars, traveling at night. Nine end-door baggage cars will be required to carry the seventeen airplanes in each squadron. Each train will be preceded by an officer, who will select landing fields and make arrangements with local Liberty Loan committees for the entertainment of the fliers.

Photographers of the Signal Corps will accompany each squadron. They will take photographs of each of the American cities visited, the plates will be dropped from airplanes by parachute, and hurried reproductions made for the benefit of the residents of all cities visited.

The schedule follows:

Eastern Squadron—New York, Philadelphia, Washington, D. C., Richmond, Charleston, Savannah, Jacksonville, Atlanta, Birmingham, Nashville, Louisville, Lexington, Cincinnati, Indianapolis, Toledo, Detroit, Cleveland, Pittsburgh, Buffalo, Rochester, Syracuse and Boston.

Mid-Western Squadron—New Orleans, Jackson, Memphis, Little Rock, St. Louis, Peoria, Chicago, Milwaukee, Duluth, Minneapolis, St. Paul, Sioux City, Omaha, Des Moines, Kansas City, Wichita, Muskegee, Oklahoma City, Dallas.

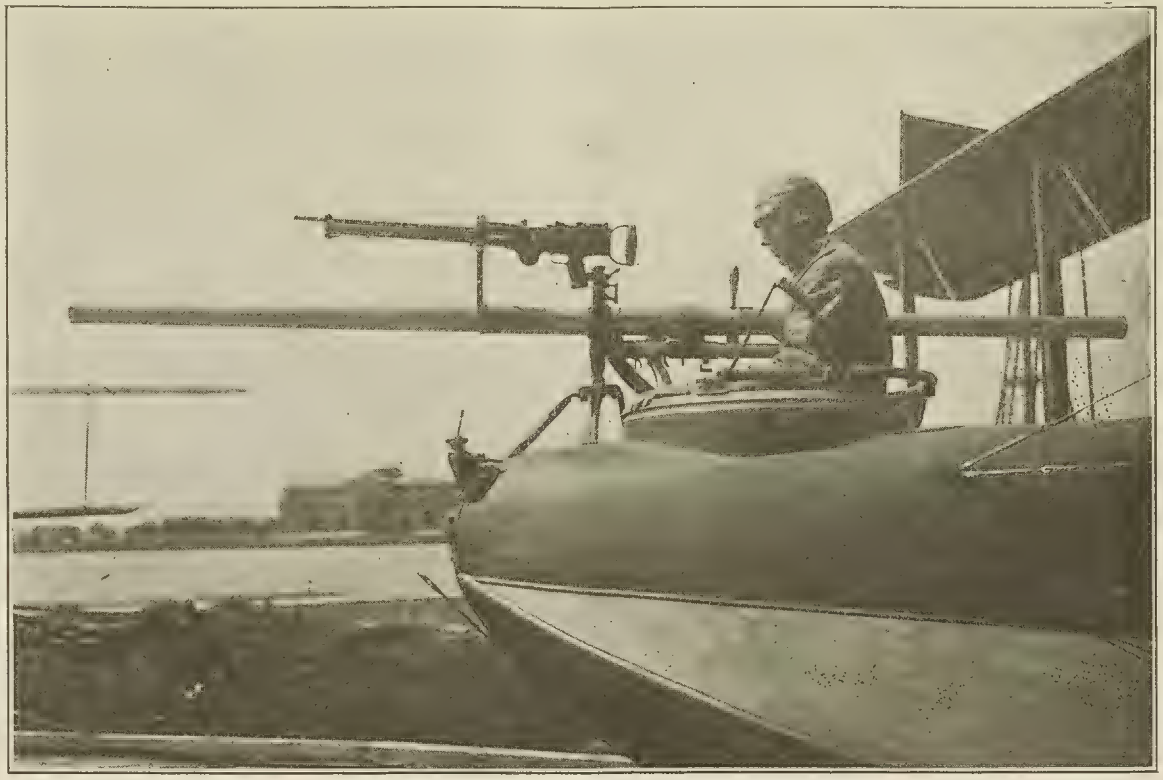
Western Squadron—Los Angeles, Fresno, San Francisco, Sacramento, Reno, Salt Lake City, Boise, Walla Walla, Portland, Seattle, Yakima, Spokane, Missoula, Butte, Sheridan, Denver, El Paso, Phoenix.

If weather conditions permit and the train reaches Denver on scheduled time, the cities mentioned below may be visited: Pueblo, Trinidad, Santa Fe, and Albuquerque, N. M.

DEMOBILIZATION OF AIR SERVICE

(Prepared by Statistics Branch, General Staff, War Department, March 22, 1919.)

According to reports received from the Air Service the net decrease in the total commissioned and enlisted strength from the date of the armistice to March 13 was 57 per cent.



The Davis Non-Recoil Gun was used by the Navy for anti-submarine work, as it is the only gun of large caliber which has been successfully mounted on an airplane. The mounting of a Lewis machine gun to fire tracer bullets is a recent innovation

The following table shows the distribution and per cent of net decrease to March 13. The strength figures include only officers and men not yet ordered discharged. They do not include men at demobilization camps awaiting discharge.

	Nov. 11	Mar. 13	Per ct. net decrease
Cadets	5,775	1,187	79
Officers	20,586	7,631	63
Enlisted men	164,266	72,460	56
Total	190,527	81,278	57

During the two weeks from February 27 to March 13, the strength of the Air Service overseas decreased 5,140 men against 4,440 during the previous four weeks. The strength of the Air Service in the U. S. and overseas is shown for various dates in the following table:

	In U. S.	Overseas
Nov. 11	111,846	78,786
Dec. 2	115,216	78,061
Dec. 26	99,010	59,917
Jan. 30	46,919	57,527
Feb. 27	33,649	53,087
Mar. 6	33,068	50,763
Mar. 13	33,331	47,947

ONE CAR FOR THE AIR SERVICE

The Motor Transport Corps' so-called “taxi service” in the city of Washington, D. C., will be discontinued on March 29, 1919.

On and after that date one car only will be available to the personnel of the Air Service for the transaction of official business. This car will be assigned to the Office of the Director of Air Service and will be under the direct charge of Captain George W. Gibson, Administrative Group.

A. S. Officers Killed

Lieut. Col. Frederick W. Dickman, commanding officer at Souther Field, and Major John W. Butts, executive officer, were killed last week in the fall of an airplane in which they were making a flight. Colonel Dickman was the son of Major General Dickman, commanding the Third American army of the expeditionary forces.

Weather conditions were favorable and they had been flying over the field for about twenty minutes and were making the last turn before landing with motor shut off when the airplane went into tail spin and being so near the ground, about one hundred feet, were unable to recover normal position.

As both were expert aviators, it will never be known who was operating the airplane. They quite frequently made flights together, each in turn operating the airplane from either the front or rear cockpit, relieving each other while in flight.

Lt. Col. Dickman will be interred in the National Cemetery, Arlington, and Major Butts at West Point.

Major Earl S. Schofield, Commanding Officer, at Souther Field, ordered all work suspended until Monday, April 7.

HONORABLE DISCHARGES

The following officers of the Air Service have been honorably discharged: Herschel Lutes, First Lieut., A. S. A.; Joseph O. Freck, First Lieut., A. S. A. P.; Roger W. Andrews, First Lieut., A. S. A.; Edward W. Clark, 3d, First Lieut., A. S. A. P.; William R. Kiefer, First Lieut., A. S. A.; D. Dwight Douglas, Captain, A. S. A.; Frank B. Makepeace, Jr., Captain, A. S. A.; Louis M. Merrick, Second Lieut., A. S. A.; James A. Meissner, Major, J. M. A., A. S. A.; Curran S. Benton, Major, A. S. M. A.; William B. Poynter, Second Lieut., A. S. A.; R. Hunter McQuistion, Captain, A. S., A. P.; Cameron B. Waterman, Major, A. S., A. P.; Theron A. Clements, First Lieut., A. S., A. P.; Truman W. Eustis, Captain, A. S., A. P.; Oscar L. Halsey, Captain, A. S., A. P., and Alan F. Winslow, Second Lieut., A. S. A.

WILL RECOMMEND FOR DECORATIONS

A Board of Officers to consist of the following personnel is appointed to review recommendations for the Distinguished Service Medal, and to make recommendations to the Director of Air Service as to further action: Brig. General William Mitchell, J. M. A., A. S. A.; Colonel Chalmers G. Hall, A. S. A.; Colonel Arthur L. Fuller, A. S. A.; Colonel Henry C. Pratt, A. S. A.; Lt. Colonel Oscar Westover, A. S., A. P., and Major Charles R. Cameron, A. S. A., Secretary (Non-voting Member).

SIGNAL CORPS METEOROLOGISTS

The Signal Corps wants 100 meteorologists. This class of men would be exceedingly valuable in the operation of the Air Service.

Trial Flights of the British Rigid Airships

The R33 Performed Satisfactorily, Carrying Thirty Persons—Her Sister Ship, the R34, Remained in the Air Continuously for Nineteen Hours

After some disappointing delays the great airship R33, built for the Royal Air Force by Armstrong, Whitworth & Co., at the Barlow Aviation Works, near Selby in Yorkshire, made a trial flight on March 6. The cruise lasted just three hours, rather shorter than was expected, but the behavior of the ship is understood to have been quite satisfactory. The maximum altitude reached was 2,000 feet, and the average speed attempted 45 to 50 miles an hour, though capable of 15 to 20 miles an hour more. The number of persons carried, including the crew, was 30.

British Rigid Airship, R 33; *Hp.*, 1250; *speed,* 70 *m.p.h.; leng th,* 670 *ft.; master diameter,* 79 *ft.; disposable lift,* 29 *tons*
Photo International Film Service

Built for War Purposes

The great airship has been built to the order of the Admiralty, and is therefore designed for war purposes. She has been freely spoken of as the vessel which will attempt the transatlantic flight. Her designers claim that she will be capable of the flight, and it is significant that the Admiralty have given permission for her to be fitted with extra gasoline capacity and otherwise equipped for an eighty hours non-stop run.

The history of airship manufacture by the Elswick firm at Barlow dates back only to 1916, and it is now claimed that the R33 is equal to anything which the Germans had in commission when the armistice was signed.

The length of the R33 is 670 feet. Her diameter is 78 feet, and she has a capacity of 2,000,000 cubic feet, just double that of the R29, which was turned out of the Barlow works in 1918, and which has since done good work with the Grand Fleet. Her lifting capacity is 30 tons, and she has four gondolas—one fore, two amidships, and one aft. She is fitted with five 250 h. p. Sunbeam-Maori engines, with a maximum speed of 2,500 revolutions per minute, two being in the after car driving on to one big propeller with a sweep of 19 feet.

Built in Nine Months

The whole of the lattice girders which form the structure of the vessel, and the gondolas have been made at the Newcastle aircraft works of Armstrong, Whitworth & Co., and she has taken a little over nine months to build. As an instrument of war she is fitted to carry four 88-lb. bombs and sixteen 120-lb. bombs, and has platform accommodation for six guns. Communication between the gondolas is established by a passage within the outer envelope, running the entire length of the ship, and she is, of course, fitted with long-range wireless apparatus.

The R33 is constructed of duralamin, which accounts for the fact that she weighs less than 30 tons, with her 19 gas bags filled with hydrogen. She displaces 60 tons of air, and besides her own weight can lift 30 tons. The crew numbers 23. One of the main exterior features is the streamline to reduce wind resistance. It gives the ship a comparatively blunt head, a full body, and a long tapering tail. The general shape is that of a torpedo.

Trial Flight

On the occasion of the trial flight of the ship was in charge of Commander Hicks, R. A. F., who had with him in the forward observation and navigating car Major Thomas, R. A. F. (captain), Captain Leatham (first lieutenant), and Lieut. James, R. A. F. (chief engineer). She left the hangar without mishap about 11 a. m., and shortly after 2 she was back and had been safely housed. No trouble of any kind was experienced at any stage, and the reason why the flight was limited to three hours was the receipt of a wireless message that bad weather was coming up. As it was, the ship was put to a good test, especially in landing during a strong wind, and stood it quite successfully. "We took her to about 1,000 feet straight away," he said, "and flew at three-quarter speed from 45 to 50 miles an hour in circles, but we ultimately got up to nearly 2,000 feet. We had no engine trouble whatever. Everything worked absolutely well. We made no height trials; those will have to follow later. During the three hours we were in the air we traveled in a circle, touching York, Leeds, Doncaster and Howden."

Trial Trip of the R34

The Clyde-built airship R34, a sister ship of R33, is the third airship built by William Beardmore & Co., at Glasgow. This vessel made her initial test flight on March 15, and ten days later remained in the air continuously for 19 hours. The itinerary included a flight to Dublin, the circling of the Isle of Man, and home by way of Liverpool and the Midlands. It was intended to remain in the air 24 hours and circle Ireland, but extremely stormy weather forced a curtailment of the trip.

Sir William Beardmore, head of the firm which built the R34, says that he is preparing to construct two other airships, both larger than the R34. Sir William believes that within a very short time regular airship transatlantic service will be established. Definite plans have been drawn up with a view to mail service between England and America.

Beardmore is no visionary, but a practical business man and an expert engineer, and though he is not yet prepared to discuss the trial problems for publication, he made the foregoing prediction with absolute confidence in its early realization.

Transatlantic Trip This Month, Perhaps

The first transatlantic flight may be accomplished within this month, with either the R33 or the R34, piloted and manned by officers and men formerly in the Royal Navy.

This is the impression gathered by the correspondent of the Chicago *Daily News* from conversations with officials of the Air Ministry and with the officers directly connected with the airship branch of the service.

"We are taking up the study of long-distance flying with rigid airships," a high technical airship officer said. "We are not primarily concerned with crossing the Atlantic in a hurry, but as that body of water offers a greater cruising space than the North Sea we are conducting our experiments and studies there. Some day—and it may be any time now—the pilot of one of our ships somewhere over the Atlantic will find the weather conditions favorable, and he will go all the way across. If he makes an economical fuel run over he will probably return to the British Isles without landing on the other side."

Still Another Airship

A new airship which in the opinion of its builder will fly across the Atlantic with ease is approaching completion at the Aerodrome Vickers at Barrow-in-Furness.

This rigid airship is known as the R-80. She is expected to be ready for trials soon. Many believe she will mark considerable improvement on any airship yet built.

The hull is of the most perfect known streamline shape and is equipped with three bow mooring attachments which enable the ship to be moored out from a tower in such manner that it is left free to turn in any direction and lie with the wind.

Four cars are attached to the hull. The forward control car, the passenger car and two wing cars for machinery only are attached on opposite sides of the airship. The control car is of sufficient size to contain all navigating controls, instruments and navigating crew.

A special type of buffer bag and buoyant covering is fitted in the forward car and also to each machinery car. These buffer bags will enable the airship to float on water and will absorb any bump when landing. The airship will be fitted with four Wolseley-Maybach engines of 240 nominal horsepower each. This engine is specially developed for airship work.

Arrangements are under consideration for preparing this ship to fly across the Atlantic this summer. The airship will carry a crew of sixteen men and will have ample endurance to cross the Atlantic, carry a good number of passengers and still have a considerable margin to allow for flying against adverse winds.

This makes three airships, one already flying, a second completed and a third nearing completion, which it is believed are able to cross the Atlantic easily.

Ludendorff's "Break Through" Air Tactics

(*Continued from page* 1)

forces so that the enemy may remain in doubt as to the significance of the attack.

88. MOMENT FOR EMPLOYING FULL STRENGTH OF AIR FORCES—Only *when the enemy has evidently become aware of the impending attack*, shows strong air forces and begins a serious artillery reply, must every effort be made to master the enemy's air forces, especially his balloons, and to increase the effectiveness of our artillery fire by full use of our air observation.

The shorter the period between the engagement of the air forces and the beginning of the attack, the more unexpectedly this is effected and the more these forces are centrally controlled, the greater will be their effect on the course of the attack. The increased activity in the air must then not be confined to the zone of the attack, but must be extended at least as far to the flanks as is the action of the artillery on the ground.

89. ACTION AGAINST ENEMY'S CONTACT PATROLS—As soon as our own fire becomes heavy there is *generally* a considerable increase in activity of the hostile infantry aeroplanes. It is the duty of the machine guns and anti-aircraft batteries to beat them off, as a barrage of pursuit machines is impossible at so low an altitude. It is advisable to push anti-aircraft batteries well forward; they should not open fire until the beginning of the attack.

90. PATROLLING THE LINE—*During the artillery and trench mortar preparation, small formations of scouts* must remain above the lines and prevent every attempt of single machines or small patrols to fly over our front. They must fly at two or three levels, according to the weather. Larger formations, flights or whole squadrons, must occasionally search for hostile machines on the other side of the lines and bring them down. Care must be taken, however, that our air forces are not used up before the attack begins.

91. BOMBING SQUADRONS must be sent out during the artillery preparations against railway stations, camps, large dumps and aerodromes in turn. During the night and on the morning before the attack, the most important objectives are the enemy's aerodromes. Attacks on trains on open sections of line—carried out at very low altitudes by daring airmen—may cause a train to derail and thus have important results. Attacks on hostile headquarters may cause dislocation in the conduct of operations by the destruction of telephone circuits.

92. ARTILLERY AEROPLANES, besides reconnoitering targets, must not be employed solely for the registration of single batteries. They are peculiarly adapted by their mobility and wide field of observation to check periodically, during short flights, a whole series of shoots for effect, and to insure that there are no gaps in the fire. A temporary increase in the rate of fire greatly assists them in this task. This is specially important when dense smoke impairs visibility for other means of observation. The effect of the fire should be tested during intervals in the firing.

93. ACTION IMMEDIATELY BEFORE THE ASSAULT—Our own air activity should in no circumstances conspicuously increase shortly before the assault. It is even better that most of the low-flying machines should turn off to the flanks or rear a few minutes before it takes place.

Only high-flying scouts must remain over the enemy's lines shortly before the assault, in order to keep down the enemy's air observation. It must be arranged by definite orders that nothing in the air shall give a hint of the impending attack.

94. THE MOMENT OF THE ASSAULT is the most critical for the engagement of aircraft units. The machines must not betray the beginning of the assault by their presence, nor must they appear until the enemy's barrage has opened. But, on the other hand, they must take part in the infantry battle with machine gun fire, hand grenades and bombs, and engage the hostile artillery and air forces.

These results can only be obtained by means of detailed instructions in the orders for the attack as to their activity, and by the most absolute punctuality in their engagement in the battle.

95. BATTLE FORMATIONS MUST ATTACK FIRST; they will be held in readiness on conveniently situated aerodromes or advanced landing grounds. They must start at the right moment and keep sufficiently far behind the front not to be seen by the enemy; but, at the same time, must be able to attack punctually to the minute. In certain circumstances, it is recommended that the time of flight be ascertained by a single machine on the day of the attack itself, as the strength of the wind may upset all calculations.

All protective flights which are available during the infantry battle, and also reconnaissance flights which are not being used for patrolling the battlefield, should be put in as battle flights to engage ground targets. The greater the forces released for this purpose, the greater will be the moral effect produced on the enemy. *Air observation for the artillery and the* HIGHER COMMAND, however, *must in no case be allowed to suffer.*

Battle flights should not direct their attacks only on the enemy's front lines, they should also seek suitable targets farther to the rear—e. g., hostile batteries still in action, reserves in readiness or advancing, traffic on the roads chiefly used by the enemy for bringing up reinforcements and supplies.

Central control must insure, that when the battle flights are put in, dispersion of force is avoided, and that the great effect of a number of machines cooperating at points of decisive importance in the battle is fully developed.

96. PURSUIT FLIGHTS should appear at the same time as that of battle flights; their duty is, by pushing forward over the line, to destroy the enemy over his own ground and to prevent his

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reconnaissances from establishing the main direction of our attack.

Strong forces must secure the flanks against envelopment, as the enemy will always attempt to make his attacks and reconnaissances with the sun at his back, the flank next the sun is specially in danger, and the strongest forces, well echeloned in height, should be placed there.

It is desirable to divide the air above the battlefield into several sectors slightly overlapping. In the attack orders each flight or chain should be allotted a fairly wide sector and a particular altitude, which may only be left owing to particular occurrences and for special reasons, except to carry out rapid attacks on hostile formations which must be dealt with outside the areas allotted.

The overlapping portions of sectors should include the vital points of the battlefield in order that the air forces may be particularly strong there. At heights above 13,000 feet the use of aircraft in the manner described above only becomes necessary when the front of attack is very wide; forces working at great heights must not be dispersed, as they generally have to engage stronger formations which are endeavoring to penetrate into the black areas.

By adopting this system of allotting sectors it is possible to avoid the disadvantage of an excess of strength over certain localities with a resulting weakness at others.

97. The infantry aeroplanes (contact patrol machines) should appear a few minutes after the commencement of the assault; they should follow the forward movement of the infantry; report any interruptions of its methodical progress, especially noting strong points which remain uncaptured and require a renewed artillery preparation; and call for identification of the front line as soon as the objective is reached. Premature demands for contact patrols signals are always unsuccessful and make the infantry uneasy; time must be given it to settle in the new positions and overcome the resistance of small hostile detachments. When an infantry aeroplane has observed that the objective ordered has not been reached, it should report at once by wireless the points attained. Doubtful points must be reported as such, and subsequently cleared up by further reconnaissance. To supplement reports, sketches should subsequently be made and dropped.

In the case of an attack with distant objectives the front lines must be fixed in the course of the attack during the periods laid down for barrage halts. In no circumstances, however, should the attack be checked for this purpose. Besides following the advance, the infantry aeroplanes must watch the general activity of the enemy, in order to report counter-attacks and the assembly and the pushing forward of reserves and to ask for artillery fire at the proper time.

98. Bombing attacks on hostile aerodromes are specially effective during and shortly after the attack, as they considerably dislocate the engagement of the enemy's air forces and may partly prevent it, whereas attacks on camps and ammunition and supply dumps are of less importance at the moment. On the other hand, bombing and machine gun attacks on batteries in action or against reserves may seriously hinder the enemy's action.

99. Action of artillery aeroplanes after the assault—Only the artillery aeroplanes remain continuously over the battlefield before, during and after the assault.

Their action in the battle is concerned less with obtaining a large number of observations at the moment of the assault *than* with the *uninterrupted watching of our own and enemy's activity during the whole battle and with rapid and timely reporting to our batteries concerned.* It is of the greatest importance to report the hostile batteries which are most active, batteries successfully engaged, well and badly directed fire, good targets which are not fired on, etc. The artillery aeroplanes must be given definite orders for such observation, which they must carry out in addition to general supervision of the battlefield. They must know exactly what orders have been given to their own artillery, so that they may suit their action to the course of the battle. Their work will only be successful if they have been thoroughly instructed.

100. Balloons—The work of the artillery airmen will be supplemented by the use of balloons, which, if sent forward early, will furnish exceptionally valuable reports to the commander of the troops and to the artillery. They will be sent forward immediately before or after the first attack with comparatively little danger, as the hostile artillery will be kept engaged in other tasks.

101. Action of battle and pursuit flights at the assault—After the assault, battle flights must be in readiness for action again as soon as possible, so that they can be used against counter-attacks.

Renewed attacks on balloons may be useful.

As regards the further importance of pursuit flights, it must be remembered that the enemy will not know the time of the assault, and therefore will not at first have a strong force of aircraft over the battlefield. On the other hand, as soon as the assault commences he will send up all his available strength, in order to gain supremacy in the air. A considerable increase in the enemy's strength will, therefore, have to be reckoned with during the period extending from half an hour to 1½ hours after the assault.

Fresh pursuit flights must, therefore, be put in about three-quarters of an hour after the attack, so that the attack may also have his greatest strength in aircraft engaged at this time.

102. Action in a break-through battle—If the attack develops into a break-through battle and the artillery advances, the same tasks fall to the various aircraft formations in the advance and on the new battlefield as are laid down above. The order for them to move forward must be given at the right time.

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Lieut. Van Meter's Parachute

First Lieut. Solomon L. Van Meter has just returned to Kelly Field from Dayton, Ohio, and has been assigned to duty with the Engineering Department. He is the inventor of a parachute, designed for the safety of aviators, which has recently been successfully tested out at Wilbur Wright's Field, Ohio. The work has now been transferred to McCook's Field, Dayton, Ohio, where all research work and the testing of material takes place.

Lieutenant Van Meter's parachute, which is enclosed within an aluminum container is placed in the body directly behind the rear cockpit. Under the container is a powerful spring which, when released throws the parachute a distance of at least twenty feet from the ship, at which time the parachute immediately opens and draws the pilot from the ship. At the same time the pilot releases the spring which discharges the aluminum cartridge, the pilot himself is automatically released from his seat.

When he is released, the seat falls back a short distance against a slideway and makes his departure from the ship less abrupt. The spring is easily released by pulling a ring fastened on either side of the pilot's seat.

AIR SERVICE MEDICAL

By direction of the Director of Air Service, and by agreement with the Surgeon General of the Army, the Air Service Division of the Surgeon General's Office is discontinued, effective March 14, 1919, and its functions, including the supervision of the commissioned and enlisted personnel of the Medical Department on duty with the Air Service, have been transferred to the Chief Surgeon, Air Service.

This new branch will be the Medical Section of the Executive and Administrative Group, and will be under the direction of Chief Surgeon, Air Service, Colonel Albert E. Truby, M. C.

CANCELLATION OF CONTRACTS

The following summary of the value of cancellations and suspensions of contracts to March 19, 1919, totals $480,730,131:

	Value	Per ct. of total
Engines and spare parts	$250,409,982	52
Airplanes and spare parts	167,554,386	35
Chemicals and chemical plants	19,852,370	4
Instruments and accessories	13,832,902	3
Balloons and supplies	10,071,035	2
Fabrics, lumber and metals	7,968,324	2
Miscellaneous	11,041,132	2
Total	$480,730,131	

628 DH 4 PLANES AT FRONT

(Prepared by Statistics Branch, General Staff)

The following table and diagram shows the status of production, shipments and use overseas of De Havilland 4 service planes at the date of the armistice:

	Number	Per ct. of total Production
Produced	3,227	100
Floated	1,185	58
Rec'd at French ports	1,185	37
Assembled overseas	1,025	32
Put into service overseas	984	30
Put into service at front	628	19
In commission at front	457	14

CHANGING PLACES IN THE AIR

Lieut. Myron E. Lackey recently in a Curtiss training plane changed his position in operating from the second cockpit to the first at an elevation of 3,500 feet. While changing the plane without control made a forward plunge and sideslip and lost 500 feet of elevation.

Answers to Correspondents

All bona fide inquiries will be answered by letter to the inquirer and included in these columns. Questions should be accompanied by stamped addressed envelopes.

War Inventions Board

A. F. G.—The proper place for you to send your experimental propeller is the War Inventions Board, War College, Washington, D. C.

Air Service in France

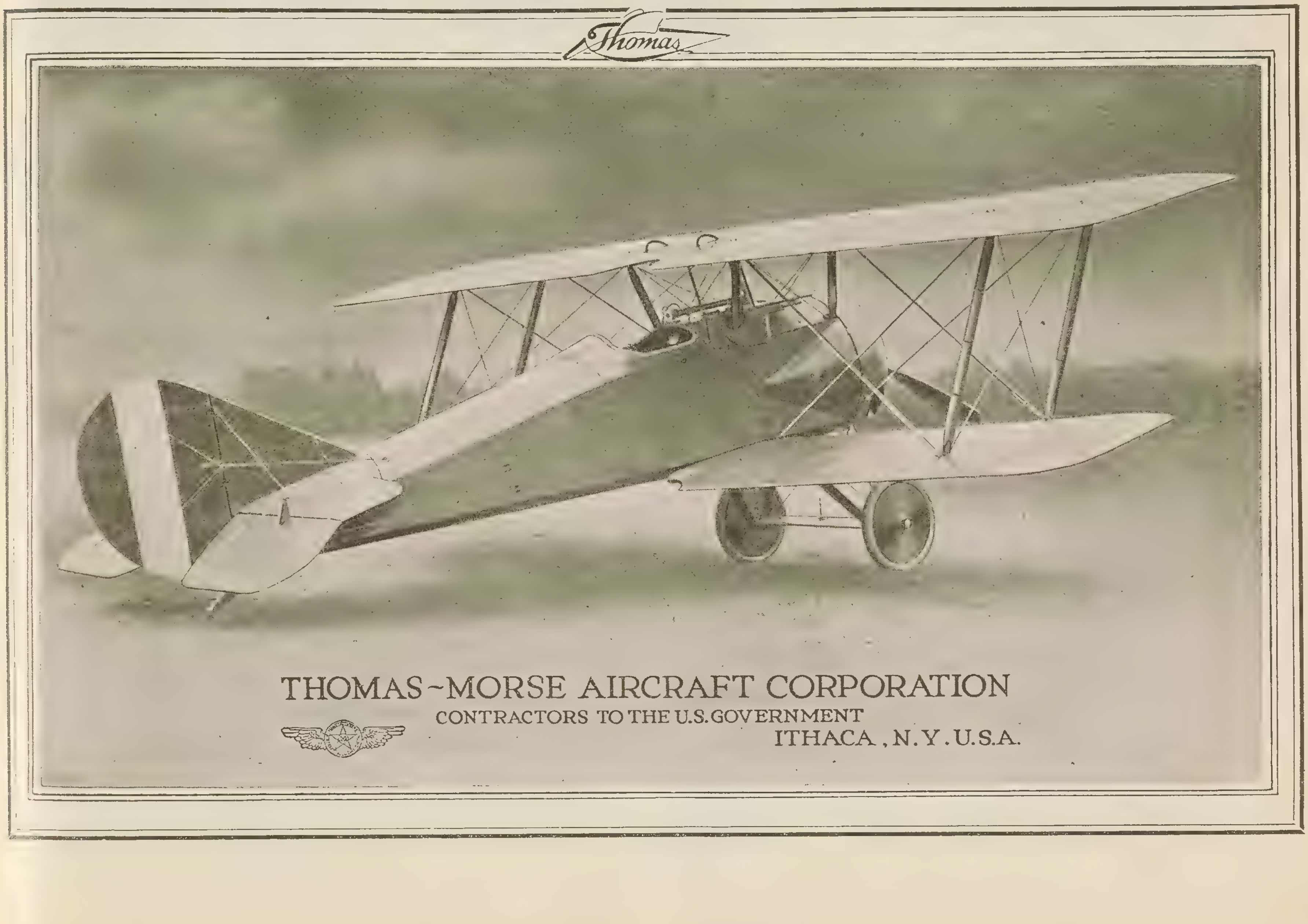
F. Q. M.—The first place that was occupied by the first combatant air service squadron in France was at Villeneuve-les-Vertus, Marne, South of Epernay in January, 1918.

In Charge of General Mitchell

B. Q. T.—The Director of Military Aeronautics is still nominally in command of the Department of Military Aeronautics, but for administrative purposes he is the Third Assistant Executive to the Chief of Air Service. Brigadier General William Mitchell now holds that office.

Horsepower for a Helicopter

J. M.—The Helicopter will probably require more horsepower for a given weight than the airplane to give the same rate of climb. The design of a helicopter propeller to lift a ton is capable of many variations, since it would be possible to use a small or a large motor. If a 100 horsepower motor were used to lift 1 ton, a propeller of about 15 ft. diameter revolving at 400 r.p.m. would probably be quite suitable, but there are numberless combinations possible.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Aviation Ball April 26

An aviation ball is to be held at the Ritz-Carlton Hotel, Saturday evening, April 26, the proceeds of which are to be used in erecting a memorial to American aviators who lost their lives in the war. It is hoped that this memorial will take the form of a club house to be erected in New York.

The committee is headed by Major Thomas B. Hitchcock.

Major Hitchcock and his associates have organized as the Air Service Committee and are occupying offices with the British-American Recruiting Commission at No. 511 Fifth Avenue. The secretary, Major Geoffrey H. Bonnell, has been working with the commission. The treasurer is Lieut.-Col. Grayson M. P. Murphy.

Most of the committee members are on the list of patrons of the aviation ball with which it is planned to open the campaign for funds. It is to be held at the Ritz-Carlton Hotel Saturday evening, April 26.

Major-Gen. Charles T. Menoher heads the patrons. Others are Brig.-Gen. William Mitchell, Col. Arthur Woods, Major Frank C. Page, Major Charles Biddle, Commander John H. Towers, Lieut.-Col. J. A. Drexel, Lieut.-Col. H. E. Hartney, Lieut.-Col. Hiram Bingham, Major William W. Hoffman, Major Philip J. Roosevelt, Clarence H. Mackay, James W. Gerard, Major Clifford B. Harmon and Capt. Francis Iglehart.

Some of the patronesses are Mrs. W. K. Vanderbilt, Mrs. W. K. Vanderbilt, Jr., Mrs. H. P. Whitney, Mrs. John Purroy Mitchell, Mrs. William J. Schieffelin, Mrs. John R. Drexel, Mrs. Otto Kahn, Mrs. Newbold Edgar, Mrs. C. C. Rumsey, Mrs. W. P. Sloane, Mrs. Charles Van Rensselaer, Mrs. Herman Oelrichs, Mrs. Arthur Woods, Mrs. George F. Baker, Mrs. Belmont Tiffany, Mrs. Clifford B. Harmon, Mrs. Norman De R. Whitehouse, Mrs. Herbert Satterlee and Mrs. Grayson M. P. Murphy.

Capt. Edward V. Rickenbacker is one of the flyers on the ball committee. Others are Major James Meissner, Lieut. Thomas Hitchcock, Jr., Lieut. William G. McAdoo, Jr., Lieut. H. P. Whitney, Jr., Lieut. Heywood F. Cutting, Lieut. George Tiffany, Capt. Douglas Campbell, Major Elliot Cowdin, Lieut. Paul Baer, Lieut. Alan Winslow, Lieut. Bradley T. Gaylord, Lieut. Gordon Balch and Major K. K. Lataur.

Aviators' Good Landing Club

The Aviation Committee of the National Special Aid Society, Inc., is opening a club house for our aviators, to be known as the "Aviators' Good Landing Club," the first of May at 114 East 39th Street. It is at the request of the fliers that this club is opening, and it will fill a long-felt want, they assure the committee. The club will include an aeronautical library, rest room, writing room and grill. The club has been started by Mrs. William Allen Bartlett, chairman, Treasure and Trinket Fund National Special Aid Society. This fund has raised and spent $100,000 on American aviators, with the hearty approval of the War Department and the National Investigation Bureau—and the gratitude of the fliers.

Jamaicans See Airplanes in Flight

The American warships which were at Kingston, Jamaica, several days, left March 28 for Guantanamo. At the request of citizens, four seaplanes flew over Kingston before the departure of the vessels. They were visible from all parts of the city, and, as this was the first airplane flight ever seen there, some consternation was caused among the natives.

"Audible Beacon" Signal

Experts of the Army Signal Corps, it is learned, have begun experiments with a recent invention which they believe will prove valuable in making the airplane a commercial utility. Described as an "audible beacon," the new contrivance is designed as a signal which will advise the aviator not only of his own position regardless of weather conditions, but will serve as accurate marks for suitable landing places.

"The beacon" is said to be a combination of the new wireless telephone and the ordinary phonograph. Its operation will be more or less automatic and will repeat a word or signal designating its position. For instance, one at Langley Field, the interdepartmental aviation base, might send out the call "Langley" at stated intervals.

Officials working on the invention believe that the next step will be the adoption of the sound-ranging device, now used by armies in connection with artillery fire, to enable aviators to determine without delay the distance and direction of the call of any one of these sending stations.

Handley Pages Southward Bound

The second Handley Page bombing plane in charge of Capt. Clyde C. Dennington, Training Section, Washington, D. C., with Lieut. Geo. M. Palmer and Geo. L. Bradford, pilots, and Lieut. Wayne Pitman engineer, and six assistants left Souther Field for Mobile at 9.22 p. m., March 27.

The big plane was accompanied into the air by Lieut. Alfred W. Vance and Master Signal Electrician Dale W. Smith in a De Haviland 4. Electrician Smith at different elevations and positions made photographs of the Handley Page.

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Bids Asked on P. O. Planes

The Post Office Department has issued specifications for multi-motored aeroplanes of strictly commercial type and particularly adapted for the carrying of mails.

The specifications are general in their terms and are designed to allow aeroplane builders the widest latitude of design and construction to give the performance required for carrying the mails. They are the result of a symposium of views of pilots, aeroplane mechanics and aeronautical engineers.

Consideration will be given to a plane of two, three or more motors connected on one shaft or set in the wings or central fuselage, or both, and carrying a minimum of 1500 pounds of mail. While the needs of the Department are preferably for a plane carrying a ton or 1½ tons of mail, consideration will be given to a machine of 1500 pounds mail carrying capacity.

What the Department especially desires is an aeroplane of the lowest possible landing speed, whether that speed is structurally inherent in the machine or accomplished through mechanical devices, and a cruising speed of between 90 and 100 miles an hour, with a top speed of between 110 and 115 miles and a cruising radius of about 6 hours with normal load. A serviceable ceiling of at least 15,000 feet is wanted. If the planes are built around Liberty or Hispano-Suiza engines the Department will furnish the motors.

According to the views of postal officials, a plane with a mail carrying capacity or 1½ tons, with a six-hour cruising radius, should not exceed 100 feet in the wing span. Engines if placed in the wing must be made accessible with safety to the mechanic for minor repairs in the air. Each engine is to be equipped with independent and, as far as possible, dual gas, oil and ignition systems to minimize engine failure.

The bids are to be opened on June 2 and it is expected that planes will be ready for delivery within six months after letting the contract.

Paris Aviation Commission

The Aeronautical Commission of the Peace Conference held a meeting in Paris, March 31, to receive and consider reports from sub-committees concerning military, legal, commercial and technical subjects. It was found that the sub-committees had not completed their work, but the commission approved the temporary reports submitted.

It was agreed to put before the Supreme Council the proposals to be finally submitted at the next meeting by the joint military and legal subcommittee. Good progress has been reached on important points in connection with the future of commercial aviation.

At the next meeting of the Commission it is expected that the general principles and much of the detail of the inter-Allied Aerial Convention may be settled finally.

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State of New York }
County of New York } ss.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared Herbert M. Williams, who, having been duly sworn according to law, deposes and says that he is the Business Manager of the Air Service Journal and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

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HERBERT M. WILLIAMS,
Business Manager.

Sworn to and subscribed before me this thirty-first day of March, 1919.

[SEAL.] FRANKLIN H. BROWN.
My commission expires March 30, 1921.

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By

LIEUTENANT ALEXANDER KLEMIN

Air Service, Aircraft Production, U. S. A., in Charge Aeronautical Research Department, Airplane Engineering Department. Until entering military service in the Department of Aeronautics, Massachusetts Institute of Technology, and Technical Editor of *Aviation and Aeronautical Engineering*. In two parts.

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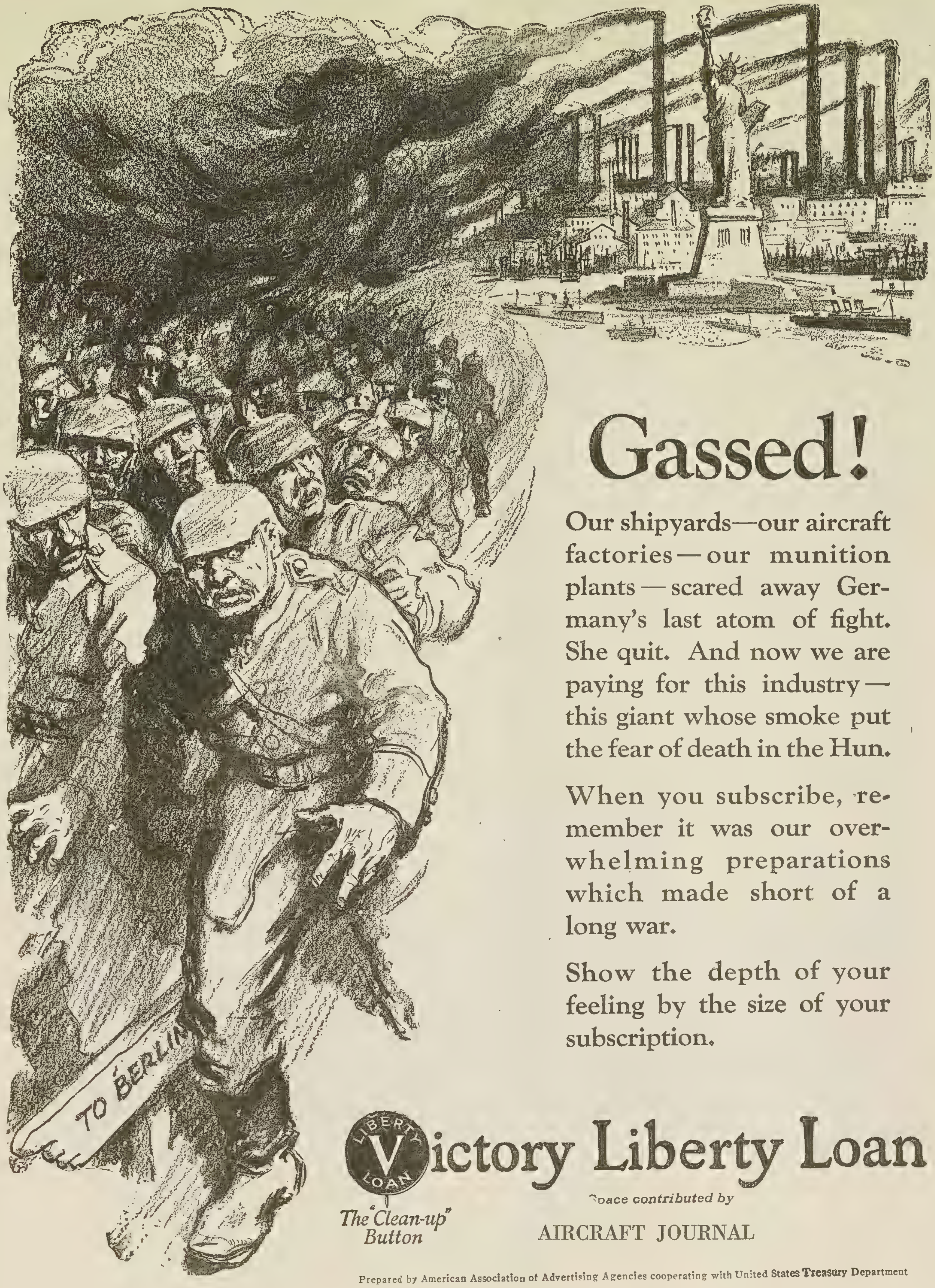

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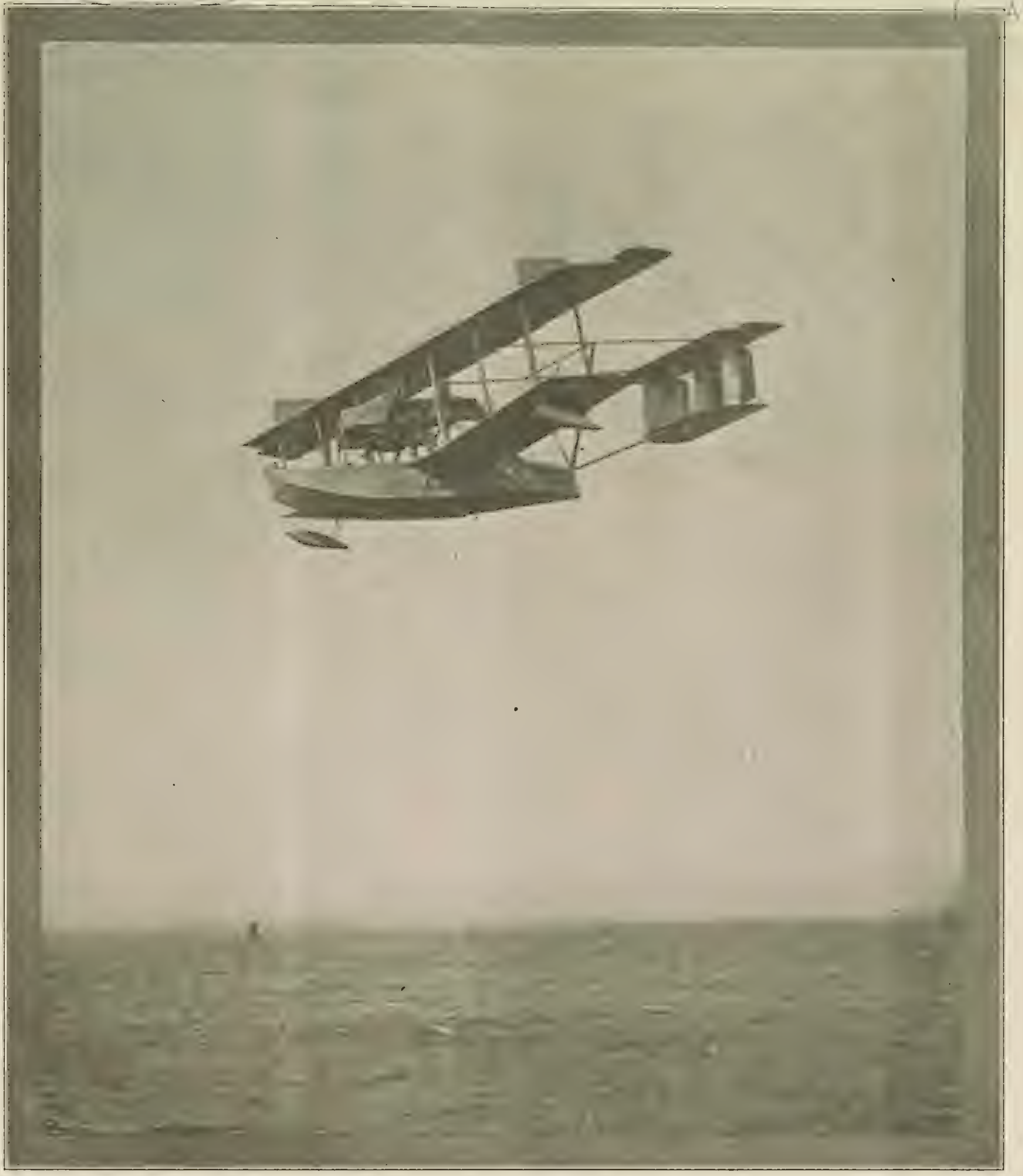

The Four-Engined NC-2 Which Is Soon Expected to Fly Across the Atlantic. The Liberty Engines Are Mounted in Tandem on Either Side of the Body

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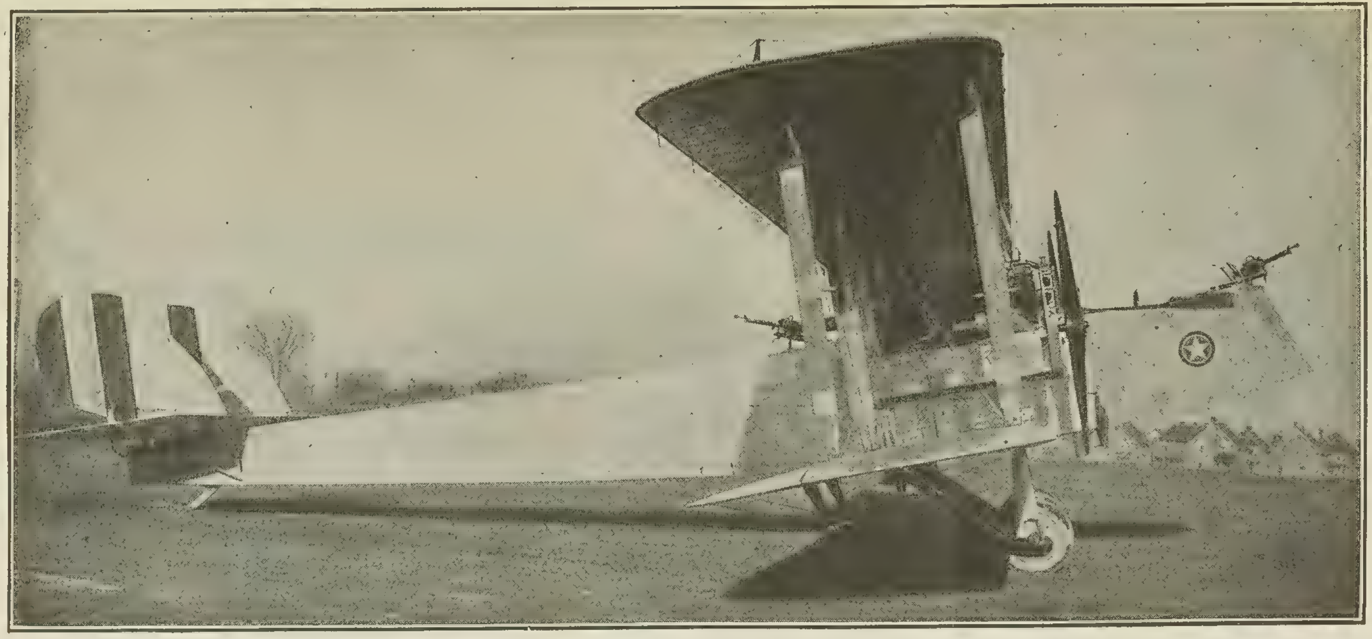

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The Pilot and the Designer

It is to be regretted, but nevertheless it is true that a certain amount of antagonism exists between the designer and the pilot, more particularly the test pilot. Although a few lucky designers are themselves good pilots, it would seem as if excellency in both fields is incompatible. It has been often said that the more a man knows about a machine the worse pilot he is. Instead of concentrating on the control of the ship, treating it like a car or a bicycle, using only a semi-reasoning instinct, the designer and technically trained pilot in general allows his interest to be scattered over various parts of the plane. He is intensely interested in the behavior of certain wires, which he thinks might be strengthened up a little on the drafting board when he comes down; what precisely is the angle of glide at this particular moment and does it agree with his calculated estimate, etc.

The skilled test pilot, although he may not be so well versed technically, is always much more at ease, can play about with his machine much better, and his impressions on manoeuvrability and balance are all the more valuable. His idea of what constitutes good vision is much more of a guide than angles of vision drawn on the board. He really does know whether one machine behaves better than another on a side slip or a spin.

The trouble arises that he cannot always communicate these impressions to the designer in the latter's ultra correct phraseology, and, in some cases, because he is unable to set down his impressions in a reasoned fashion. Sometimes his impressions though perfectly honest are unconsciously biassed by his physical condition, by his experience on other machines or by his personal views of the designer or firm in question. The designer is too apt to resent these shortcomings and cooperation becomes difficult.

There seems to be but one permanent way out of the difficulty—the substitution of measuring devices for the personal impressions of the pilot, the use of springs on the joy stick, of angle of incidence indicators, of banking and turn indicators and other instruments, which, viewed by a moderately well trained observer, remove a great deal of the personal equation and render the testing of a machine a much less speculative matter than it is at present.

The NC-2

The NC-2 indicates a very interesting departure from the standard practice in flying boat construction with boom type supports for the tail surfaces usually associated with pusher designs. There is also a very interesting feature in the use of two engines in tandem on either side. In large four-engined machines, this arrangement has already been used in the super Handley-Page, the big Bristol triplane, and in one or two big German ships.

When four engines are employed, this seems to be a very logical disposition. It is true that the rear propeller of the tandem combination loses 10 percent in efficiency no matter what is done to the pitch, as tests have indicated. This loss, however, is probably not much greater than would be the case were the engine on the wings disposed each as a separate aerodynamical unit, with consequent loss in head resistance.

One possible disadvantage of this arrangement is that if any one of the four engines goes dead, there is immediate loss of balance unless the engine on the other side is immediately—preferably automatically—cut out. If both engines on one side go dead, it may be possible to sustain flight, but very difficult to resist a spinning tendency.

An alternative arrangement for the four-engined airplane suggests itself, in which two engines are placed in tandem amid wings and one on each side. This would mean some increase in the head resistance but there would only be two engines out of the four, from which the tendency to spin would have to be feared.

It would be interesting to see a development on these lines.

Careful Consideration Necessary

It has been announced that the Air Service is considering the purchase of the Dayton-Wright factory to be used as an experimental laboratory together with a large acreage nearby for a test field. Facts and figures have been prepared which show that financially this move would be economical from the government standpoint as compared with any other project.

Those interested in the work of the Technical Section of the Air Service are questioning the necessity of such a large plant for experimental purposes in peace times. Attention is called to the fact that with the Navy asking for millions for experimental work, the National Advisory Committee for Aeronautics requiring more, and the Bureau of Standards conducting independent investigations, that Congress may feel that the experimental work of the various government departments is becoming too scattered. If this view prevailed and a joint fund were appropriated, it is obvious that any experimental station should be so situated as to permit of seaplane as well as airplane work.

The establishment of a test field so far from the producing factories is another point that is made against the proposed purchase. Labor conditions in Dayton are considered ideal for an experimental plant, but offsetting this is the difficulty of having workmen required to live at a long distance from their work. Before the plan is finally adopted, it is hoped that all interested will be given an opportunity to be heard and every possible development of the future taken into account.

What Kept Our Aviators Warm

No little merriment has been caused by the announcement of the sale of " 392,112 Chinese dog mats " (used for lining leather coats worn by aviators) by the Purchase, Storage and Traffic Division of the War Department. Whatever the merit of Chinese dog skins for keeping the American aviator warm is, the selection of such fur must have been the result of the same careful investigation as all his other needs received. From far Cathay to the front is a long trip, but let us not forget the thousands of poor canines who, in their own way, " did their bit."

Trans-Atlantic Fliers Are Baffled by Bad Weather

There May Be a Race Between the Sopwith and Martinsyde Machine—NC-2 Successfully Tested

Up to this writing the British aspirants to the London *Daily Mail's* prize of $50,000 for the first transatlantic flight have been baffled by the weather. During most of the week at St. John's, N. F., rain prevailed and reports both from English coast escorts and ships sending wireless advices to the local Meteorological Officer of the British Air Ministry showed heavy weather all the way across the Atlantic. Gales about England continued and cyclonic disturbances, with heavy seas, were generally recorded over the path to be followed.

Hawker and Lieut. Commander Grieve, his navigator, completed the last preparations on April 14, when they jacked the Sopwith up on wooden horses and tried dropping the under carriage. It never failed to slip at a tug on the trip latch, and they are well satisfied that it will drop into the sea at the desired moment. The completion of the preparations leaves them little to occupy them except consultation with Lieut. Lawrence Clements, the Meteorological Officer, and both are becoming restless and impatient, but maintaining outward good humor.

There May Be a Race

Every day of bad weather makes it more and more possible that the Martinsyde and Sopwith machines may get off together and that the world's first transatlantic air race will really be flown.

Hawker and Grieve are keenly conscious that the advantage of their early arrival slipped away when they failed to get started on April 12 under ideal conditions, and both realize that the Martinsyde expedition is bulking ever more formidably as a real competitor. It is even possible that the Martinsyde may start first, unless Hawker gets away pretty quickly, as Raynham is fully loaded and can get aloft more readily than the heavier Sopwith, and the ground at Quidi Vidi, on account of the underlying rock, is less affected by adverse weather.

Should it come to an actual race, the Martinsyde, all things being equal, could show a clean tail to the Sopwith, being capable of developing 125 miles per hour, while the Sopwith, minus the under-carriage, can do but 106 miles. It is doubtful, however, if either pilot would dare to essay much over 100 miles on a long cruise, on account of the greater petrol consumption and the added strain to the machine.

Newfoundlanders' education in aeronautics is coming slowly. One woman walked across the Martinsyde wing, thinking it made of wood or iron, and put a neat little hole into it, which was readily repaired, however. Another begged Raynham to show her how the wings were inflated.

While Hawker chafed at the elements which had held up his Sopwith two-seater for five days, Captain Raynham's hastily assembled Martinsyde went up for a trial flight on April 15 and upon its return was pronounced ready for the long trip.

Captain Raynham, apparently convinced that despite his late arrival he would start on even terms with Hawker, has discussed with the latter the question of which should carry the first official Atlantic aerial mail, which was turned over to Hawker on April 12, when it appeared certain that he would attempt the flight.

It was virtually agreed that in the event of a simultaneous start the two aviators would toss a coin to determine which should carry the mail.

Preparing for the Handley Page

Plans for the flight of a large Handley Page bombing machine from Harbor Grace are being made. The plane was reported to be on the way from England, or about to be shipped. Major Arthur Partridge, R. A. F., referee of the flights, said he had received no notification of the entry of the Handley Page and was not informed as to who its pilot would be.

Dispatches from Harbor Grace have stated that the field selected for the Handley Page take-off was being carefully prepared, houses, fences, and walls being torn down to provide ample space for the big plane's preliminary run.

Commander George Conrad Westervelt, U. S. N.
Photo by Paul Thompson

Trial Trip of NC-2

The NC-2, first born of the three great flying boats the navy is preparing to launch on a transatlantic flight, had her severest tryout to date on April 13. In addition she took up for a brief "hop" the most distinguished passenger she has carried thus far—Franklin D. Roosevelt, Assistant Secretary of the Navy, who visited Rockaway Aviation Field to see for himself how preparations are progressing.

In both flights the big biplane acquitted herself to the satisfaction of the officers in charge of the experiment. She proved powerful, fast, steady and quick on the lift and at the close of the afternoon the opinion was expressed that she could, if called on, start the cross-ocean trip at once.

The success or failure of the Hawker and Raynham efforts will be factors in determining both the route of the flight and the number of boats the navy will start. If Hawker and Raynham are unable to wing their way across, the navy is likely to blaze the air trail from Newfoundland to Ireland. If one or both of them win safely over it may be decided to try the Azores route as being uncharted and affording a field for valuable scientific observation.

Possibility of a Race

Should Hawker and Raynham fall short of success and the preparations of Col. Porte of the Royal Air Force, with his multi-motored flying boat, be pressed, circumstances might force a race between the United States and Great Britain over the Newfoundland-Ireland route, and the navy would willingly accept the challenge. Such an event as that would almost certainly set the date of the flight forward, without awaiting completion of the NC-4.

The NC-3 will be launched within the next few days. Except for attaching her propellers and a few quickly finished details, she is ready for the water and the air.

It had been planned to fly the NC-2 Saturday morning, but in tuning up her engines a throttle pin broke and the trial was put off until afternoon. At 3 o'clock Lieuts. W. Hinton and L. T. Barin, two of the lucky candidates for pilots' berths on the transatlantic flight, climbed into the fuselage, the propellers began to spin, and the order was given to cast off.

Her Flight

There was a west-northwest wind of between twenty and twenty-five miles, but the big ship, answering her helm perfectly, minded it no more than a summer zephyr. She taxied up the bay toward Jamaica, a few hundred yards, wheeled and headed into the breeze.

The ship threw a clean-cut white furrow to either side as she whirled down past the hangar, and opposite the station dock took the air. It was a matter of thirty-five seconds, the record of her first performance and seven seconds better than the best record of the NC-1.

The boat rounded the point and headed eastward. It was evident she was trying out over the measured course of thirty nautical miles between the Rockaway Point Coast Guard Station and Fire Island light. With the wind astern she was turning off well upward of 100 miles an hour, and quickly passed out of sight.

It was an hour and ten minutes before she reappeared, flying at 1,800 feet. In five minutes more she had regained the water opposite the station and made a pretty drop. Her speed was reported as ninety miles an hour.

Commander G. C. Westervelt

Commander George Conrad Westervelt, U. S. N., was graduated from the U. S. Naval Academy in 1901 and spent three years at sea, after which he took a three-year course in naval architecture at the Massachusetts Institute of Technology. For several years Commander Westervelt was stationed at the New York Navy yard and Puget Sound Navy yard in charge of construction and repair shops. He was in charge of government ship construction at Seattle Construction and Dry Dock Company for four years. In 1914 he became interested in aeronautics when, with W. E. Boeing of Seattle, he built two seaplanes which were in service for two years and afterward sold to the government of New Zealand.

He spent a year at sea in 1916 as Fleet Naval Constructor of Atlantic Fleet and as aid to the commander of the submarine force. In January, 1917, he was placed on duty in Buffalo in charge of all Navy aircraft inspection and construction at manufacturing plants, and later was made Superintending Constructor of Aircraft, with headquarters in Buffalo. In July, 1918, he established headquarters in New York, and was in charge of inspection and construction of all Navy aircraft work at the Curtiss, Standard, Gallaudet, Aeromarine and the Naval aircraft factories.

Commander Westervelt has had the direction of the design and construction of the Navy's trans-Atlantic seaplanes, of which the NC-1 is the most famous. He is at present the official representative of the Bureau of Construction and Repair in direct charge of preparing these seaplanes for the trans-Atlantic flight so far as design and construction are concerned. He was in complete charge of construction and repair aviation matters outside of Washington and at the naval aircraft factory during the letting of contracts, building of plants and inspection and organization.

Commercial Fields for the Airplane in South America

Could Overcome the Impassable Barrier Offered by the Chain of the Andes, and Also Be Used in Connection with Mining Operations

By C. A. Gardiner

Now that war needs no longer monopolize the attention of those interested in aeronautics, it is pertinent to point out the present possibilities for the commercial use of the airplane. In no part of the world are these possibilities more potent and inviting than in South America. The reasons for such conditions are not far to seek and are evident to any one familiar with the physical characteristics of the country and the present stage of development.

Inviting Possibilities

Speaking in general terms, we may describe these conditions as follows:

The principal cities, the centers of commercial activity and points of arrival and departure, lie on the sea coast and along the great navigable rivers.

Civilization in the form of ranches, plantations, mines, and other means of exploiting natural resources, forms only a fringe or border along the coasts and great rivers, this fringe or border varying in width from a few miles to a few hundreds of miles, and the heart of the continent being undeveloped and unsettled.

Rail transportation is very inadequate and expensive, most of the railroads being short spurs built inland to serve some port, and lacking connecting links to other roads and other ports.

Slow river transportation is used almost exclusively for communication between the sea ports and the developed region bordering the large rivers.

The Andes Barrier

The chain of the Andes offers a solid and almost impassable barrier between the West coast and the vast reaches of the continent to the eastward.

The untold mineral wealth of the Andes today, comparatively untouched, remains inaccessible because of the impassable nature of these mountains.

The vast plains comprising the Southern part of the continent are retarded in their development by the lack of transportation facilities.

Of course, these general statements do not exactly describe conditions, but they are sufficiently accurate to indicate the controlling factors in considering this subject.

The field of the airplane under these conditions is evidently to supply a quick means for the transportation of passengers, mail or small amounts of freight, where present means are non-existant or so slow as to be very unsatisfactory.

Concrete Examples

As an illustration of the possibilities of the airplane under these circumstances, let us take a few concrete examples.

The valley of the Amazon river and its tributaries extending inland from Para in Northern Brazil is, generally speaking, an undeveloped forest region producing nearly all the natural rubber supply of the world, and various other forest products. Many towns, some of considerable size and importance, lie along the banks, and their only communication with the outside world is by slow river steamer to Para. Manaos, a city of 50,000, is 860 miles from Para and the voyage takes several days. A fleet of seaplanes to operate along this river would be a blessing both to the inhabitants and to the operator. They could offer passenger transportation between Para and Manaos in eight hours or less, free from the intolerable heat and insect pests of the river, in place of the now interminable, dirty and uncomfortable journey of several days. Eight hours of cool, comfortable flying in place of three days of mosquito bitten torture. It certainly would command a high price. Commercial and private interests would also highly appreciate such rapid mail service.

Almost similar conditions exist in regard to the Parana and the Uruguay rivers extending northward into the interior from Buenos Aires. These regions are much more thickly settled and it is true that they have also rail transportation with Buenos Aires and Montevideo, but it is not nearly so quick nor efficient as what we are accustomed to and is very expensive. A fleet of seaplanes could very profitably operate along the Parana rivers from Buenos Aires to Asuncion, the capital of Paraguay, a distance of approximately 900 miles, taking in such important cities as Rosario (225,000 population), Santa Fé (60,000), Corrientes (30,000), and Asuncion (120,000).

Promoting the Victory Loan

(C) Harris & Ewing.

Hon. Carter Glass, Secretary of the Treasury, is shown in the picture handing Lieut. W. E. Benjamin, one of the most experienced instructors in the Air Service, a bundle of Victory Loan pamphlets to be scattered from the air over Washington.

Field for Seaplanes

These two are the most striking examples of the possibilities for the use of seaplanes along rivers, but others of hardly less commercial importance might be cited. For instance the Magdalena river in Columbia, the Orinoco in Venezuela, the San Francisco in Brazil, and numerous smaller, shorter but commercially very important rivers, in almost every country on the continent. Another striking use for seaplanes would be to offer rapid transportation between points on the coast not enjoying speedy rail connection, as for example, Buenos Aires and Montevideo. This is now an over night steamer trip, but the ninety miles could be covered in an hour by a plane. Rio Janeiro and Sao Paulo about 200 miles now, a long and roundabout rail journey. The West Coast, although it offers many opportunities for such uses, is less inviting on account of its lack of harbors and smooth waters.

Innumerable local uses for the seaplane could be found, all based on the lack of adequate transportation along rivers, lakes and coasts.

Use of the Land Airplane

Taking up the use of the land airplane, we have of course, its obvious use for carrying mail and passengers between the large cities the same as in this country and Europe. Many attractive possibilities exist along this line such as between Buenos Aires and Cordoba, Mendoza, and Bahia Blanca, over a country comparable to our Middle West and quite thickly settled; between cities of the West Coast where the rail connection is poor or nonexistant (which it is nearly everywhere); between certain large cities a short distance inland and their ports situated on the coast usually over a mountainous country such as Caracas and La Guaira, Santiago and Valparaiso, Quito and Guayaquil, Santos and Sao Paulo.

Possibilities in Argentina

Beside these possibilities we will consider some peculiar to South America. Most of Argentina is a flat, level, treeless prairie, similar to our Middle West. It is divided into vast estates which are devoted to cattle raising, cereal crops, and sheep raising. These estates are owned by immensely wealthy men who spare no expense in the development of their properties. In size these estates are immense, often numbering hundreds or even thousands of square miles in area and from them are derived practically all the riches of the Argentine, meat, hides, wool and grain. In a restricted central area railroad communication is fairly good, but for the most part it is poor or non existant. Good roads are scarce, on account of the soft earth and absence of rock for foundations, so that automobiles are not so extensively used. Communication with these estates is therefore for the most part difficult, uncomfortable, long and tedious. The airplane would solve the difficulty perfectly, except of course for for the transportation of heavy freight. Mail, passengers, and supplies could easily and safely be transported and for this purpose an airplane with a competent pilot would be a profitable investment for a large number of estancias. Then again in supervising the work on estates so vast as many of of these are, an airplane would be invaluable. The foremen now go from point to point on horseback or sometimes in automobiles, but even on an estate only twenty miles across, think of the saving of time an airplane would effect.

For Miners in the Andes

Another possible field for the use of the airplane is in connection with the mining operations of the Andes regions. Tin is found in Bolivia and copper in Peru, but it is not so much in connection with these that airplanes would be of service, as in connection with the mining of gold, silver, platinum, diamonds, emeralds and such involving high value in small bulk. These mines are generally so located as to be accessible only by steep and perilous trails over rugged mountains. The product of the mines must be packed by mule or llama or even carried on the backs of Indians to the nearest rail or seaport, and all supplies for the mines must be similarly packed to them. It is perhaps a difficult field for the airplane, and undoubtedly a dangerous one, but yet perfectly feasible. An hour's flight would in many cases give the same result as a three days' journey of a string of mules and their drivers.

South America Prosperous

General conditions in South America are favorable for the sale of airplanes. The war has brought them much prosperity through the sale of their natural products, while their imports have been restricted by lack of production or transportation from Europe and North America. Consequently they now have money to spend.

The South Americans are very fond of aviation and take a great interest in it as a sport, a military development; and a commercial possibility. They would be quick to perceive the advantages of aerial communication and unhesitating in spending the money necessary to bring it about.

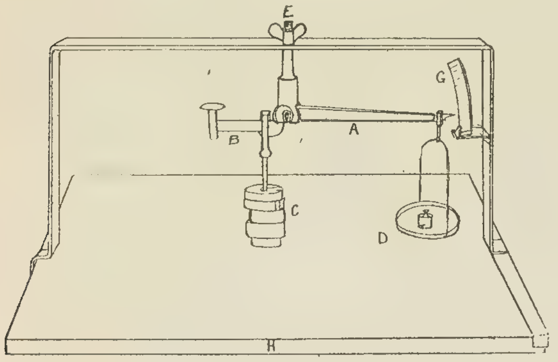
Let us hope that there are Americans possessing the imagination, the means, and the energy to see

(Continued on page 13)

Notes on Technical Aeronautics

An Instrument for Measuring Tautness of Doped Surfaces

Airplane dope has the peculiar property when applied to fabric of pulling it taut. The power of "tautening" varies with different dopes, and until recently has been simply guessed at, the method usually employed being to tap the surface with a practiced hand. This method is very unsatisfactory, however, and a very simple instrument can be used instead. This is shown diagrammatically in the sketch.



The beam A is suspended on a knife edge in the ordinary way, except that the support is connected with the screw E, which is used to adjust the beam to any height required. This screw also serves to fix the whole apparatus to a framework (F) which fits over the frame to be measured in such a way that the specified weight is suspended from the short arm exactly over the center of the frame. This weight is compensated by a smaller weight (D) in the scale pan, suspended from the long arm (A).

When this tautometer is placed on a frame, the reading of the pointer at the end of the long arm should be zero on the curved scale (G) attached to the framework at the right hand side. If this is not the case, the necessary adjustment may be effected by turning the screw (E) in the direction required either to raise or lower the beam. When this has been done the smaller weight is removed from the scale pan. This causes the larger weight (C), which till now has been just touching the surface, to rest on the doped fabric, and the depression due to it may be read off by means of the pointer and scale.

This simple instrument has been used with much success. (*Aeroplane, March 19.*)

A Design for a Cheap Single Seater

In the *Aeroplane* of March 19 appears a suggestion for a design of a cheap single seater. Arguing in favor of such a design, it is pointed out that there may be a limited number of very wealthy owners to whom the cost of owning an airplane will be unimportant, but their number will be too small to create that confidence in aerial methods of transport which, more than anything else, is needful before commercial aeronautics can take its proper place. Privately owned pleasure machines are likely to be confined to the sporting single seater of fairly high performance, possibly used for racing purposes, and the two or three seater machine of moderate performance, whereon the owner and a friend may tour the country in reasonable comfort.

The pilot who has flown modern high performance fighters, and who would like a machine of his own to fly, is not likely to be satisfied with any machine of low performance and incapable of stunting. Such a machine does not need to be very expensive or carry an engine of 80 or 100 horsepower. A number of machines have been built in England which, fitted with a two-cylinder opposed A. B. C. engine of 32 horsepower, have shown excellent performance.

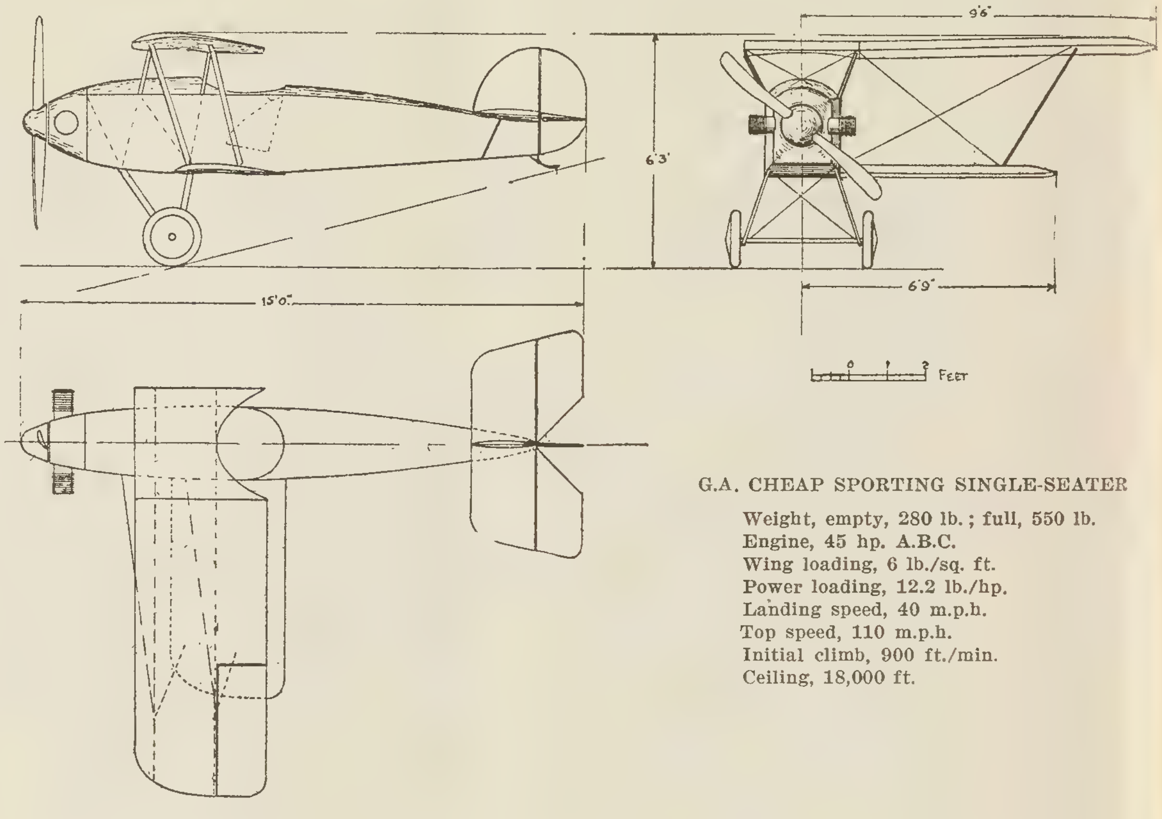
Working on similar lines, and using the improved engine now available, the *Aeroplane* suggests a machine shown in the appended figure to meet the needs of a pilot who requires a really fast machine at a moderate cost. It could be manufactured and sold in reasonable quantities at about 2500 dollars. The hangar space required for storage is very small, and owing to the small size and weight one man suffices to get the machine in or out of the shed.

At the top speed of 110 m.p.h., the fuel consumption will not exceed four gallons per hour—27.5 miles per gallon, and a touring figure of 35 miles per gallon at 85 m.p.h. could certainly be reached.

Generally speaking, the machine is on perfectly normal lines. The fuselage is of spruce-strutted, wire-braced and fabric-covered. The fuselage might be built with spruce longerons and struts and covered with thin three-ply, with no wire bracing. The latter construction would be less liable to get out of true, but if it did warp would not be easily readjusted. It would also weigh nearly 20 lb. extra.

Fuel tanks are carried over the pilot's legs, under the top fairing, where tanks for 10 gal., 2½ hr. full power fuel, can be fitted.

The planes are of normal structure, with spruce ribs and spars. The top plane, 19 ft. span by 3 ft. 6 in. chord, is level with the pilot's eye, giving a clear view over the top as well as under it. The bottom plane of 13 ft. 6 in. span and 2 ft. 9 in. chord is staggered back to give a good view forward and downward for landing. Both planes have a normal high speed section. Interplane struts are of steel tube faired with spruce and the usual type of interplane cable bracing employed. The tail unit is of normal type, but is large for the other dimensions of the machine. This is necessary in order to slow up the movements of the machine, which would otherwise be likely to prove uncomfortably quick.



G.A. CHEAP SPORTING SINGLE-SEATER

Weight, empty, 280 lb.; full, 550 lb.
Engine, 45 hp. A.B.C.
Wing loading, 6 lb./sq. ft.
Power loading, 12.2 lb./hp.
Landing speed, 40 m.p.h.
Top speed, 110 m.p.h.
Initial climb, 900 ft./min.
Ceiling, 18,000 ft.

A plain V-type chassis of steel tube, fitted with two 18-in. diameter landing wheels, is shown. It is possible that a center skid chassis would be preferable for this type of machine. It would be slightly heavier and a little more costly than the one shown, and would slow the machine down considerably.

Such a machine can be made extremely strong and robust, and experience has shown that it would be much less liable to accidental damage from bad landings, etc., than are large machines. The performance as given in the sketch is sufficiently good for most purposes. Fully loaded, the machine should reach 10,000 ft. in 14 min. and have then a speed well over 100 m.p.h.

Though primarily suggested as a sporting machine, it might have other and more definitely commercial uses.

Transoceanic Float System for Airplanes

A system of transoceanic fleets for airplanes has been recently advocated. The value of the suggestion is still to be proved, but it is interesting to note what is advocated. A brief outline of the plan is as follows:

Approximately 25 miles apart between the coast of America and the coast of Europe will be placed floats upon which the pilot can land and depart from whenever he wants to descend for fuel or repairs.

These floats are to be approximately 500 feet long and 100 feet wide, but can be increased in length and width if preferred.

These floats are built in the shape of regular steamship hulls and are kept in their position of latitude and longitude by their own power.

In the holds of these floats are carried the supplies of fuel and spare parts for airplanes, as well as a repair shop and sleeping apartments, and dining rooms, etc., for the pilots and crew.

The float contains a slowing up process whereby the speediest machines can be stopped within 300 feet and slow machines within 100 feet.

There are elevators arranged at both the bow and the stern of the float whereby airplanes can be let down into the hold and receive their fuel and repairs out of the way of other machines while landing.

The float is always headed into the wind so that the pilot always lands into the wind from the stern, while he is let down into the hold at the bow and then moved back in the hold of the steam again where he is elevated to the deck, from whence he starts off on his journey again into the wind.

News of the Army and Navy Air Services

Leases on Fields Renewed

The leases on the following fields will be renewed June 30, 1919: Wilbur Wright, Dayton, Ohio; Taylor Field, Montgomery, Ala.; Payne Field, West Point, Miss.; Eberts Field, Lonoke, Ark.; Gerstner Field, Lake Charles, La.; Call Field, Wichita Falls, Tex.; Taliaferro Field, Hicks, Tex.; Carruthers Field, Benbrook, Tex.; Barron Field, Everman, Tex.; Love Field, Dallas, Tex., and Rich Field, Waco, Tex.

The director of Air Service has ordered the following "Inactive" flying fields discontinued as activities operated by the Training and Operations Group and assigned to the Supply Group for operation as Temporary Aviation Storage Depots:

Barron Field	Everman, Texas.
Call Field	Wichita Falls, Texas.
Carruthers Field	Benbrook, Texas.
Eberts Field	Lonoke, Arkansas.
Gerstner Field	Lake Charles, La.
Love Field	Dallas, Texas.
Payne Field	West Point, Miss.
Rich Field	Waco, Texas.
Taliaferro Field	Hicks, Texas.
Taylor Field	Montgomery, Alabama.
Wilbur Wright Field	Fairfield, Ohio.

The administrative control of these activities remains with the Administrative Group as heretofore.

Must Wear the Red Chevron

According to a recent circular issued by the War Department, all discharged officers, as well as enlisted men, who wear their uniform after discharge will wear the red chevron on the left sleeve.

Demobilization in Air Service

(Prepared by Statistics Branch, General Staff, War Department.)

According to reports received from the Air Service, the net decrease in the total commissioned and enlisted strength from the date of the armistice to March 28 was 63 per cent.

The following table shows the distribution and per cent of net decrease to March 28. The strength figures include only officers and men not yet ordered discharged; they do not include men at demobilization camps awaiting discharge:

	Nov. 11	Mar. 28	Per cent net decrease
Cadets	5,775	812	86
Officers	20,586	3,569	83
Enlisted men	164,266	66,727	59
Total	190,627	71,108	63

During the week of March 28 the Air Service personnel overseas decreased 4,689 men against a weekly average of 2,462 during the six preceding weeks. The strength of the Air Service in the United States and overseas is shown for various dates in the following table:

	United States	Overseas
Nov. 11	111,846	78,786
Dec. 2	115,216	78,061
Dec. 26	99,010	59,917
Jan. 30	46,919	57,527
Feb. 27	33,649	53,087
Mar. 28	25,347	41,800

Officers Ordered to New Stations

The following named field officers have been ordered to change station as follows since March 27, 1919:

Ordered March 27—Major Dean Smith, J. M. A., A. S. A., from Brooks Field, San Antonio, Texas, to Dayton Ohio.

Ordered March 28—Major Eugene W. Crockett, A. S. A., from Fort Omaha, Neb., to Washington, D. C., on temporary duty; thence to Air Service Depot, Garden City, Long Island, N. Y.

Ordered March 31—Major LeRoy S. Simons, A. S. A., from Washington, D. C., to Aviation General Supply Depot, Little Rock, Arkansas.

Major A. A. Cunningham, M. A. C.
(C) *Harris & Ewing*

Major A. A. Cunningham, commander of the U. S. Marine Aviation Corps, has just arrived in Washington from France and has received the highest commendation for his unit from the major general commanding.

The marine aviators were a picked body of men whom Major Cunningham trained after he had been to the front and had seen for himself the work they were to do.

Major Cunningham in 1912 was made the first marine aviation officer, and for a time was the entire aviation section.

D. S. M.'s to A. S. Officers

By direction of the President, under the provisions of the Act of Congress approved July 9, 1916, the Distinguished Service Medal has been awarded to the following named officers of the Air Service upon recommendation of the Commanding General, American Expeditionary Force:

Col. Townsend Dodd, U. S. Army. For exceptionally meritorious and distinguished services. He organized the aviation training school at Issoudon, and successfully conducted the negotiations for the first purchase of aeroplanes from allied governments for the use of the American Expeditionary Forces.

Col. Charles DeF. Chandler, U. S. A. For exceptionally meritorious and distinguished services. As chief of the Balloon Section, Air Service, American Expeditionary Forces, from November, 1917, to February, 1919, he rendered notable service in the supply, administration and operation of the balloon units that so thoroughly demonstrated their efficiency during all the major operations of the American Expeditionary Forces.

Col. T. DeW. Milling, Air Service, U. S. A. For exceptionally meritorious and distinguished services. First as Chief of Staff, and later as Commander, he organized and conducted the operations of the Air Service of the First Army during the entire operations of that army. By untiring, painstaking and energetic efforts he succeeded in raising the efficiency of his command and insuring the proper cooperation with the land units. He exhibited professional attainments of the highest order, and exercised a marked influence on the success of the First Army.

Reserve Military Aviators

The following named officers, having completed the required tests, are rated as Reserve Military Aviators, to be effective from the dates set after their names: First Lieuts. Rex E. Field, A. S. A., March 18, 1919 and Charles W. Martin, A. S. A., March 18, 1919; Second Lieuts. John V. Calhoun, A. S. A., March 18, 1919; Clifford E. Gilpin, A. S. A., March 18, 1919; Benjamin D. Harrison, A. S. A., March 18, 1919; Lawrence F. Kraft, A. S. A., March 18, 1919; Thornton C. Morrow, A. S. A., March 7, 1919; Richard F. Shaw, A. S. A., March 18, 1919; Lewis R. Trezona, A. S. A., March 18, 1919; Alfred R. Coningsby, A. S. A., March 13, 1919, and Anthony J. Kerin, A. S. A., Feb. 1, 1919; First Lieut. George K. Thomas, A. S. A., March 6, 1919; Second Lieuts. Elmer C. De Montel, A. S. A., Feb. 28, 1919; Charles R. Rowland, A. S. A., March 20, 1919; Robert W. Patterson, A. S. A., March 20, 1919, and Harvey C. Waugh, A. S. A., March 14, 1919; Major Samuel M. Strong, Medical Corps, March 15, 1919; First Lieuts. Andrew J. Yarrell, A. S. A., March 1, 1919, and John P. Stone, A. S. A., Feb. 28, 1919; Second Lieut. William M. Lanagan, A. S. A., Feb. 28, 1919; First Lieuts. George W. Rogers, A. S. A., March 8, 1919, and Frank W. Cawthon, A. S. A., March 6, 1919; Second Lieuts. Roderick N. Ott, A. S. A., March 6, 1919; Richard P. Minor, A. S. A., March 6, 1919; Isadore Robinson, A. S. A., March 6, 1919; Jesse J. Gee, A. S. A., March 10, 1919; Matthew M. Sullivan, A. S. A., March 14, 1919, and Howard N. Tandy, A. S. A., March 14, 1919; Capt. Albert M. Wilcox, A. S. A., March 15, 1919; Second Lieut. Louis T. Barry, A. S. A., March 15, 1919, and John Preston Richards, A. S. A., March 13, 1919; First Lieut. George B. Fredell, A. S. A., March 12, 1919.

Air Service Contracts

(Prepared by Statistics Branch, General Staff, War Department.)

The following is a summary of the values of cancellations and suspensions of contracts through March 22, 1919:

	Value	Per cent of total
Engines and spare parts	$266,961,771	54
Airplanes and spare parts	165,288,590	33
Chemicals and chemical plants	18,648,239	4
Instruments and accessories	10,761,081	2
Balloons and supplies	10,071,035	2
Fabrics, lumber and metals	7,977,445	2
Miscellaneous	13,634,218	3
Total	$493,342,379	

Orders for Liberty 12's Completed

The Packard Motor Car Co. made the final deliveries of Liberty 12 engines during the week ended March 21, 1919. This completes all contracts. The following shows the number and per cent produced by each factory:

Firm	Number Produced	Per cent of total
Packard Motor Car Co	6,500	32
Lincoln Motor Co	6,500	32
Ford Motor Co	3,950	19
General Motor Co	2,528	12
Nordyke-Marmon Co.	1,000	5
Total	20,478	

Physical Standard High

The standard of the Marine Reserve Flying Corps is very high. No men are accepted for entrance into its ground school with the prospect of becoming officers unless they are as nearly physically perfect as possible.

Applicants must weigh not less than 135 pounds and not over 165 pounds. The enlisted personnel has been selected from the very best in the Marine Corps.

They are highly trained and given every opportunity for promotion to a commission.

German Airship Awaits a Chance to Cross the Atlantic

Count Zeppelin's Nephew, with His Ship Ready, Chafes Because Other Airmen Are Likely to Make the Transatlantic Flight First

While the two British rigid airships R-33 and R-34 are being tuned up in anticipation of their attempt to cross the Atlantic, a German Zeppelin is awaiting the opportunity of being permitted to participate in this contest. A correspondent of the New York *World,* who was granted permission to visit this airship, describes his impressions as follows:

I have just been over the giant Zeppelin built at the Zeppelin plant here for transatlantic flight—the first foreigner granted permission to enter its hangar. It was practically ready for use when the armistice was signed, and could have been made ready in three weeks for a flight.

Baron von Gemmingen-Guttenberg, a nephew of Count Zeppelin and for three years an airship commander, took me over the Zeppelin and explained it to me in detail. He strongly resembles his uncle, and the dream of his life is to be the first airship commander to cross the Atlantic in an airship. Consequently he is keenly interested in and jealous of the English airmen's plans for the transatlantic flight. With a Zeppelin capable of the flight, ready but prevented from flying on account of the outcome of the war, he is chafing here at the thought that some other airman may cross first.

Would Start Without Tests

"I am so certain that this Zeppelin can make the flight to America," said Baron Gemmingen-Guttenberg, "that I am willing to go with it right out of this hangar and steer across the Atlantic. I should need no air tests in advance and should need only to be informed by wireless of the course of the general air currents, ordinary observations such as are made at Washington daily.

"Two great powers will probably divide the air routes of the world—England and America," the Baron went on. "I notice that England is making big preparations and is spending immense sums, which America so far apparently has neglected to do, though she can't afford to be slow if she wishes to keep abreast of the times. Once behind, it is difficult to catch up. Germany is now ahead of any other country, but her hands are bound on account of losing the war. We are two years ahead of England's latest dirigible, the R-33, with which she evidently expects to cross the Atlantic.

Believes England Will Control Air Routes

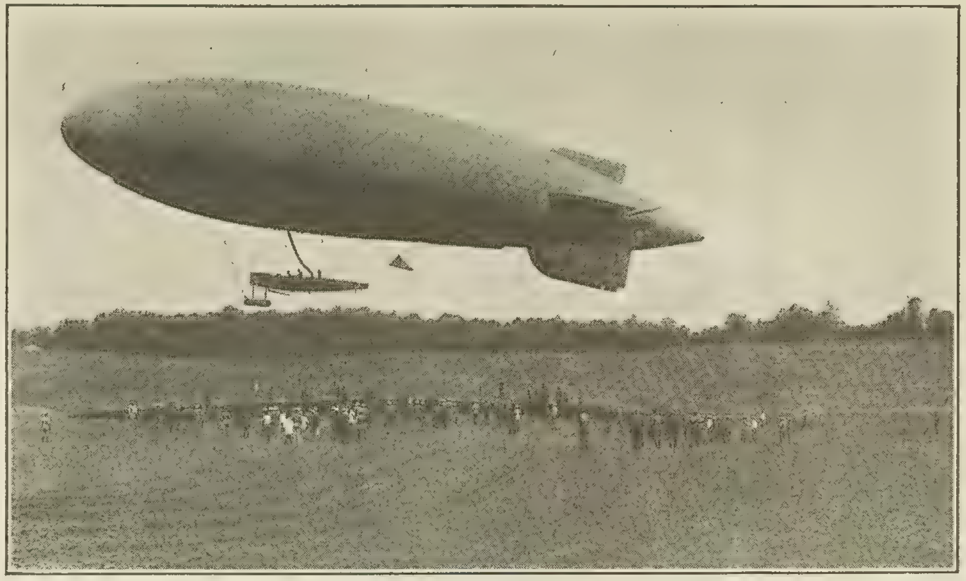
"From published details I believe the R-33 is the same type as the German 43 which was brought down in England two years ago. It is strikingly similar to the 43 even in its smallest details."

The Baron believes that the air routes of Europe, Africa and Asia will be controlled by England, while America will control both the Americas and the Pacific. He expects the normal Pacific route will be from San Francisco to Honolulu, Australia, then north to Japan and return.

The biggest German Zeppelin now is 70,000 cubic metres' displacement. It is big enough to cross the Atlantic, but for the Pacific it will need 100,000 displacement.

The Zeppelin I inspected here is a war machine, but the Baron explained where cabins would be feasible along the keel. The number of passengers or mail carried is dependent upon the length of the route, each passenger reducing the quantity of fuel carried. This Zeppelin would burn forty tons in crossing the Atlantic.

A new plane, designed but upon which work has not yet started, could fly from Germany to San Francisco over Greenland with a crew and perhaps fifty passengers, the Baron declared.



AN AMERICAN BLIMP TAKING OFF

He is sure that flights anywhere on earth are feasible, citing the German flight to Khartoum and return and his personal experience of 104 hours' continuous flight over the eastern front and the Baltic. He explained why he had so often been able to escape detection during the war.

How He Escaped Detection

"I invented what I called a periscope, being a long cable let down under the Zeppelin with the observer at its end so that the Zeppelin could pass over a protecting cloud while the observer below the cloud could be directing operations," he said. "I always did the observing myself. Once in a flight over Calais I was able to come so low I could make out the railroad station by a slight reflection from lanterns on earth. I was amused afterward when I read that bicyclists coming from Dunkirk had been arrested because they were supposed to have given me directions. London was wonderfully successful in concealing itself, only the shape of the Thames giving it away."

Free Balloons in Modern Aeronautics

Very recently the Balloon and Airship Division of the Air Service ordered thirty-six free balloons to be made out of surplus kite balloon fabric. This may appear a queer thing to do, with the war practically over. The question may be asked why an expenditure for these obsolete spherical drifters was made.

There is no more apology needed for this step than there is for the Navy when it orders small sailboats to train Annapolis cadets. The free balloon is to aviation what the sailboat is to navigation. With it the airman can put himself at the mercy of the forces of nature and then extricate himself and get back safely to earth. In no other way can a man more quickly grasp the true meaning and possibilities of meteorological phenomena.

A slight fall of temperature, a warm gust of wind, the drifting of a cloud over the sun, the rifting of a fog bank may mean death or great hardship unless he does the right thing. Pendant beneath this buoyant sphere, he is wafted through the realms of space to a final safe landing near the utilities and comforts of civilization or to fall in some lone place from which he can extricate himself only by superhuman effort. He may fall to his death after a period of chill unconsciousness in the great altocirrus heights. He may be left broken and bleeding after being dragged, in case he fails to land properly, in a windstorm or be drowned in case his course takes him over some great body of water where his balloon lets him down.

What better expedient can then be devised to inspire profound research of meteorology, with ultimate true knowledge of the phenomenal of the air?

In our generation we have seen fit to invade the aerial heights and make them the arena of our combats, our routes of communication and our paths of pleasure. So, too, in some past dim distant age, did men first essay to use the ocean. Even to this day with all our accomplishments in engineering, great ships are lost because the masters and crews in times of mechanical failure, cannot hoist sails and ride to safety, using the very winds that would destroy them. Still in this day are ignorant adventurers on the deep drifted to death along the shores. Many a stately ship is stranded and damaged because the powers of even gentle winds are not known to masters trained to trust in artificial power alone.

If the airship is to be a success, it will be one because those who pilot it know the powers and characteristics of the wind and the meaning of the symptoms of storms. Landings in gales must be made at times. The airship cannot play the part of a pampered beauty who goes out only on calm and sunny days.

The master pilot of an airplane or airship by various expedients can find the direction and speed of wind strata; using this knowledge, can know when to seek safety before his fuel gives out. He can evade or overcome storms. He can effect economies of management or give greater pleasure to the multitudes who from now on will venture up into the blue arch of heaven to satisfy the yearning of their childhood days to be among the clouds and see what it all looks like.

Millions of people line the shores of New York Bay every few years to see the sailing yacht races. They revive this old sport. Why? To see what nation can build craft most cannily and handle them most skilfully under the forces of the surface breezes.

A few people have begun to watch the skies to sight those brave adventurous souls who, leaving all behind, drift on in sunshine, in clouds, in darkness and in silence through the remote heavens to distant landings when the air gives them up.

Which is the greater adventure, to take a horse and a gun off on the plains, to take a sailboat with supplies and compass out onto the blue reaches of the ocean, or to take a sphere of gas and barely enough food to sustain existence for the period of flight and then start off to match your wits and endurance against every peril that nature can provide?

Which of these sports will develop the true airman? the true celestial navigator? Ask yourself these question and you will know why the air service wants free balloons.

Recruiting 15,000 Men for the Army Air Service

Special Expeditions from Various Fields Are Participating in the Drive—Advantages to the Men Who Enlist

The Army Air Service launched its first recruiting campaign on April 9, in connection with the three Victory Loan Flying Circuses, operating chiefly for the Treasury Department. These flying expeditions were organized at Ellington Field, Texas; Hazelhurst Field, Long Island, and Rockwell Field, California, to tour adjacent sections. They comprise 12 or 15 American pilots each, including an American Ace who won distinction in the air overseas, and aces from the French and British air services who also distinguished themselves in their battles with the enemy. An Air Service recruiting officer is attached to each flight.

Some of the Work for Which the Air Service Needs Men

Authority has just been received by the Director of Air Service to send out special recruiting expeditions in airplanes from seventeen air service centers and four balloon fields in an effort to recruit men for the Air Service. Not only will flights be made over neighboring cities, but demonstrations of assembling and taking-down planes will be staged. In this drive for recruits the Air Service will co-operate with local general recruiting agencies.

Many Recruiting Flights

Flights will be made from the following air stations:

Rockwell Field	San Diego, Cal.
Langley Field	Hampton, Va.
Post Field	Fort Sill, Okla.
Kelly Field	San Antonio, Tex.
March Field	Riverside, Cal.
Mather Field	Sacramento, Cal.
Carlstrom Field	Arcadia, Fla.
Dorr Field	Arcadia, Fla.
Ellington Field	Houston, Tex.
Park Field	Millington, Tenn.
Souther Field	Americus, Ga.
Selfridge Field	Mt. Clemens, Mich.
Chanute Field	Rantoul, Ill.
Scott Field	Belleville, Ill.
Bolling Field	Anacostia, D. C.
Hazelhurst Field	Mineola, L. I., N. Y.
Repair Depot	Montgomery, Ala.

Air Service recruiting parties will also be sent out from the following balloon fields:

Lee Hall	Virginia.
Fort Crook	Omaha, Neb.
Arcadia	Florida.
Brooks Field	San Antonio, Tex.

Cosmopolitan Personnel

The Air Service opens a universal training campaign besides the mere search for recruits. The personnel of the Air Service is made up literally of men in every trade and walk of life. A list of the personnel of an aero squadron or a balloon company includes several kinds of mechanics, including radio, airplane and aero motor, tool makers, metal workers, coppersmiths and bench mechanics. Besides these men there are needed wireless telegraph and telephone operators and repair men, propeller makers, balloon and airplane fabric workers, balloon riggers and cordage workers, instrument makers, armorers, carpenters and cabinet makers, hydrogen gas operators, balloon winch mechanics, photographers, draftsmen, electricians and chauffeurs.

Enlistment in the Air Service offers many advantages to the skilled man as well as the unskilled. To the skilled workman in any of these trades there become available many non-commissioned grades; master signal electricians who earn, including their board, room, clothes and savings for annuity, over $2000 per year; sergeants first class, sergeants and corporals. Out of a squadron of 150 men, 114 are non-commissioned officers, corporals or better.

Recent regulations provide that a man discharged from the service may now re-enlist for one year without further obligations. He must, however, have had experience in the Air Service. He receives upon his re-enlistment the $60 bonus accompanying his regular discharge, and may secure a furlough for one month following his re-enlistment. Excellent opportunities are provided for these men, and there are vacancies in every non-commissioned grade. Good opportunities for clerks, typists and stenographers are also available.

Can Select a Branch

The unskilled civilian who enlists in the Air Service is offered a course of instruction in the particular branch of the Air Service he elects. A three-year enlistment is required. General and special schools are maintained for the enlisted men; they are instructed by competent skilled teachers, and, unlike the operations of a private school, the quicker and better they learn, the more the Government is satisfied, because the better their instruction, the more value they are to the Government.

The age limits for enlistment in the Air Service range from 18 to 45 years, inclusive. Men must specify if they desire service in the Air Service and other corps organizations, in which case they will be enlisted for the infantry, but will be transferred immediately to the service they desire, for assignment to duty and sent to a flying field. Out of the quota authorized for the Air Service—15,000 men —only the men re-enlisting will be accepted for the one year period; others for three years. The features of the plan, however, make enlistment or re-enlistment attractive.

Instructions have already been issued to the flying fields covering conditions under which enlisted men may learn to fly. The main qualifications determining whether or not an enlisted man will be taught how to fly are physical qualifications, combined with the necessary mechanical knowledge which he must have before he will be allowed to participate in flights or will be allowed to receive instruction in an airplane. The average enlisted man with a high school education, who has applied himself so that he has a good knowledge of motors and airplanes, and is in such condition physically that he can pass the required examination, can learn to fly. After a man learns to fly, he will, if properly qualified from an educational viewpoint, be given an opportunity to secure a commission in the Air Service. Regulations are now being compiled covering this phase of the service.

15,000 Men Needed

The Air Service has been given authority by the General Staff to recruit enlisted men up to about 15,000. The advantages are:

(1) Permanent employment during this unsettled period of uncertainty.

(2) Positive wages, room, board, medical attendance, etc., free.

(3) $60 allowance when discharged for re-enlistment for service during the war.

(4) One month's furlough, allowing them the advantage of a vacation.

To these advantages, every recruiting officer can make his own additions.

There are many things to be considered about enlisting in the Air Service, the most important of these is the apparent disparity between pay of civilians and pay of enlisted men in the Army. At the first glance, everything seems to be in favor of the civilian, whereas, as a matter of fact, if the question were analyzed closely, the average pay of the enlisted man compares very favorably with that of the civilian. One point that seems to have been overlooked entirely is the question of retirement pay after thirty years' service. After thirty years' an enlisted man is retired on three-quarters of the pay that he is receiving at the time his thirty years are completed, and in addition he is given allowances of heat, light, etc. This retired pay should properly be considered in his monthly pay while he is in active service, and can be compared to an annuity, said annuity amounting to all the way from $100 to $500 a year, depending upon the grade that the man holds at the time of retirement. This can be considered a part of what he earns and should be included as a part of his salary.

From information received from the Department of Labor, the average pay of the civilian from twenty to twenty-five years of age is $885 a year. This takes into consideration the amount of time in which he is unemployed on account of holidays, change in position, etc.

In the Air Service the man is paid for holidays, there is no time lost on account of change in posi-

(*Continued on page* 12)

Fly Over Sierra-Nevada

A report from Mather Field states that on March 22 three De Haviland-4 airplanes flew from Mather Field to Sacramento, Calif., thence to Carson City, Nevada, crossing the Sierra-Nevada Mountains en route. The distance covered in the flight was 120 miles and the average time was 85 minutes. It was stated that this was the first time the mountains have been crossed by heavier-than-air machines.

The three machines were piloted by Lieut. Col. Henry L. Watson, commanding officer of Mather Field, First Lieut. James T. Crowell, officer in charge of flying, and First Lieut. T. S. Curtiss, assistant officer in charge of flying. The three passengers were Sergeant First Class Leo Conway, Second Lieut. Chas. W. Schwartz, flying instructor, and First Lieut. Francis W. Ruggles, engineer officer. A Curtiss plane piloted by Lieut. F. D. Hackett also made the flight from Mather Field to Carson City, approximately 90 miles, in 2½ hours. The Curtiss machine crossed the mountains at an altitude of eleven thousand feet.

The three De Haviland-4's crossed the range of mountains at an altitude of 14,000 feet. The report states that at this altitude the temperature was approximately 10 degrees above zero, but the pilots had no trouble in the flight, the motors working perfectly all the time. The average consumption of gas per machine for the trip was 33 gallons.

The machines landed one mile east of Carson City in a very good field and after gassing the planes, they left for Reno, Nevada, where a safe landing was effected four miles east of the town.

The return trip was started from Reno about noon on March 23. A stop was made at Carson City for gas and oil, and at this point, Governor Boyle of Nevada took the place of Lieut. Ruggles in one of the ships, and was carried from the capital of Nevada to the capital of California, and thence to Mather Field. Governor Boyle has the distinction of being the first civilian to make the flight across this range of mountains.

An interesting feature of the trip is the time saved in transit between these two cities. Eight hours and five minutes was saved on railroad travel. The average train time between the two capitals is 9½ hours, while the airplane averaged 85 minutes. The object of the flight was to prove that airplanes are practical for flights over particularly rough stretches of country where existing routes by rail or road are indirect.

It is stated that previous flights over this range have been attempted by civilian fliers from time to time during the past five years, but owing to insufficient horsepower the attempts were not successful. Although the altitude at Reno and Carson City is over 4,600 feet, the fliers experienced no difficulties with their Liberty engines.

Zimmermans with Aeromarine

Paul G. Zimmerman, the mechanical and aeronautic engineer, is now connected with the Aeromarine Plane & Motor Co., Keyport, N. J., and his brother, Lieut. C. J. Zimmerman, U. S. A., R. C., former instructor of acrobatics at Call Field, is with the same company as test pilot.

Civilian Flying Licenses

The Office of the Joint Army and Navy Board of Aeronautical Cognizance, charged with the issuance of civilian flying licenses, is now located in Room 232, Building D, Sixth and B Sts., Washington, D. C. Since the discharge of Lieut. Haugen, Lieut. A. J. Clayton, A. S., M. A., has been acting secretary. The membership of the Board otherwise remains unchanged.

Aircraft Greet Admiral Sims on His Arrival at New York
(C) *Keystone View Co.*

There have been issued forty licenses since February 25, as follows:

License No.	Issued to.	Address.
339	Alfred S. Koch	Washington, D. C.
340	John Domenjos	New York City.
341	James A. Roe, Jr.	New York City.
342	Merrill K. Riddick	New York City.
344	Penrose B. Metcalfe	San Angelo, Tex.
345	John H. Hughes	Macon, Ga.
345a	Harry Richard Kashe	Anacostia, D. C.
346	A. J. Brubaker	New York City.
347	Homer M. Berry	Okmulgee, Okla.
348	Julian Sykes	Chicago, Ill.
349	Paul W. Peterson	Underwood, Iowa.
350	L. S. Ryan	Underwood, Iowa.
351	David L. Behncke	Chicago, Ill.
352	Joseph L. Cato	New Haven, Conn.
353	Edgar F. Waters	Milltown, N. J.
354	Louis M. Merrick	Washington, D. C.
355	George Perkins	Washington, D. C.
356	Ellis S. Middleton	Anacostia, D. C.
357	Lyman Patterson	Anacostia, D. C.
358	J. B. Struble	San Francisco, Calif.
359	Stuart J. Davies	Utica, N. Y.
360	Herbert M. Schick	San Mateo, Calif.
361	Charles Henry Kinzie	Philadelphia, Pa.
362	Romer G. Weyant	Lincoln, Nebr.
363	Cortlandt S. Johnson	Washington, D. C.
364	Aircraft Service Corp.	Detroit, Mich.
365	Stuart A. Morgan	New York City.
366	James Ward	Houston, Tex.
367	Ray A. Dunn	Lynbrook, N. Y.
368	Wesley L. Smith	New York City.
369	Earl F. Beers	Essington, Pa.
370	Edward A. Stinson	San Antonio, Tex.
371	Paul W. Ward	New York City.
372	W. J. Falvey	Brookline, Mass.
373	Hubert E. Phenicie	Manchester, Iowa.
374	I. B. Humphreys	Denver, Colo.
375	Lucielle Belm't Baldwin	Chicago, Ill.
376	Charles Theodore	Dallas, Tex.
378	Barney Benes	Cleveland, Ohio.
379	Frank G. Seyfang	New York City.

Britains Progress in the Air

The civil aeronautical position in Great Britain is hailed by the British press as being "far more advanced than in any other country," the American Chamber of Commerce in London reports.

When General Seely, Under Secretary for Air, presented the air estimates for 1919-20 to the House of Commons premier emphasis was laid on the appropriation of £3,000,000 ($15,000,000) for civil aviation research and experiment.

A mail service from Cairo to India is definitely to be inaugurated. The air route has already been surveyed, and the route from Cairo to the Cape is being surveyed.

Both in the British Isles and in the Possessions aerodromes are to be established at suitable spots with full equipment of meteorological instruments, sound and light signals, balloons and aerial buoys, wireless telegraphy and telephone equipment.

Already "cargo planes" are in sight. A huge British seaplane of novel type, equipped with five Rolls-Royce motors, has already been flown carrying 6 tons at 100 miles per hour. Another with a carrying capacity of 9 tons is being experimented with.

The remarkable British military achievements in the air are expected to be completely eclipsed by the development of the airplane as a commercial and economic factor.

American Bosch Changes

Several changes and additions have been made to the staff of the American Bosch Magneto Corp., Springfield, Mass. W. G. Brown has been transferred from the New York branch to Chicago, where he will have charge of that territory, acting as branch manager; T. C. Miller, formerly assistant branch manager at Detroit, has been appointed branch manager at New York; Harold A. Wilson, formerly of the Diamond State Fiber Company, has become assistant branch manager at Chicago; A. C. Hyser, formerly in charge if service of the Willard Storage Battery Co., goes to Detroit as assistant branch manager of the Detroit branch, and Oliver S. Stanley, formerly assistant manager of the St. George Paper Co., Norwalk, Conn., has been made assistant manager of the New York branch.

Exploration By Airplane

An important page in the faintly written history of Ungava was turned April 5 when the main aviation exploration expedition of the Ungava Products Company left Quebec City on board the steamer Amherst, en route for the north.

Operations will be extended at a later date to Ossokmanuan Lake, Sandgrit Lake, Gabbro Lake, Michikamats River, Dyke Lake, Petitsikapau Lake and Attikaangen Lake. An area of approximately 50,000 square miles will be explored.

The personnel of the exploring party has been drawn largely from the Royal Canadian Naval Air Service, as the new company plans to penetrate this summer into the unknown regions of New Quebec entirely by airplane.

CAPT. J. M. FOOTE

Captain "Jack" Foote, the well-known testing pilot of the United States Army is now with the L-W-F. Engineering Company, Inc., College Point, N. Y. He was a well known football player while at the University of Chicago and Dartmouth College.

In 1914 and 1915 he was an automobile salesman in Chicago.

In December, 1916, he made arrangements to join the Royal Flying Corps, but in a few days before the time set for his sailing for England he joined the Signal Corps of the U. S. A. Army and reported at Ashbun Field, Chicago, to Lt. Morrow, who is now Col. Morrow.

In February, 1917, the field was transferred to Memphis, Tenn., where he did his first solo flying. Then he was transferred back to Ashbun, Chicago, where he graduated in the first class of Reserved Military Aviators. This class, which has since become famous, includes Sanford, Ortmeyer, Schroder (who holds the altitude record in America), Alsop, Thompson and Jones.

In June, 1917, in a squadron of twenty pilots he flew from Ashbun to the new field at Rantoul, Illinois, about one hundred miles away.

On June 1, 1917, he became an Instructor and trained many of the American aviators.

In September, 1917, he was made Instructor in advanced flying and in November, 1917, he took charge of all the L-W-F machines at Rantoul.

On December 13, 1917, with **H. W. Blakely**, pilot for the L-W-F Engineering Company, he flew from Rantoul, Ill., to San Antonio, Texas, and established a record for speed which has since been unequalled for distances of over one thousand miles. The average speed of this flight of 1357 miles was 138.4 miles per hour.

While at San Antonio, he tested over one million dollars worth of L-W-F machines. These machines were tail-spun, looped, barrelled, tail-slid and nose dived and proved satisfactory in all respects.

Capt. J. M. Foote

The latter part of December, 1917, he returned to Rantoul and was then transferred to San Diego, Cal., where he took charge of testing and instruction in stunt flying. Among his many pupils was the late Major John P. Mitchel, formerly mayor of New York.

In the spring of 1918, although one side of his face was paralyzed from wind blast, he continued his wark as instructor in stunting.

On May, 4, 1918, he was ordered to Americus, Ga., to take charge of testing at Souther Field.

In June 1918, he was sent to the L-W-F Field on Long Island, where he tested model G-2, an all-American battle plane. This machine was put through all kinds of stunts and proved very satisfactory. He then reported to the Technical Section at Dayton as Test Pilot. There he put many ships through their performance tests.

In October, 1918, he was sent to England with the Technical Section to study the British methods of testing. At Martelston Heath and Warenborough, he flew many of the British machines.

On December 23, 1918, he returned to the States and reported at Dayton. There he requested his discharge to take a position as Test Pilot for the L-W-F Engineering Company. He tested the DH-4, which was remodeled and rebalanced by the L-W-F Engineering Company for the U. S. Mail Service. This machine carries a variable load of seven hundred pounds gas and five hundred pounds mail.

Captain Foote has over twelve hundred hours in the air to his credit, the majority of which were in advanced flying. It is believed that he has flown more different makes of machines than any pilot in the Air Service. Among the models which he has flown are the following: The L-F-W Model G, the Le Pere, the Ordnance 150 H.P. and 80 H.P., the Vought, the DH-4, the DH-9 the Bristol fighter with the 300 H.P. Hispano-Suiza, the Bristol scout with the 80 H.P. Le Rhone motor, the SE-5, single seater fighter with 150 H.P. Hispano-Suiza, the Standard M-Defense scout, the Sunbeam Bristol, the Snipe, the Sopwith Camel, the Handley Page, the Avro and many other planes of foreign and American make.

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Recruiting Men for the Air Service

(Continued from page 9)

tion, and the following points may be favorably considered as inducements that the Army offers which the average civilian job does not offer:

(1) Liberal allowances of furloughs in times of peace; (2) Free medical and dental attention; (3) Excellent chances to travel; (4) Free amusements; (5) Athletic facilities; (6) Physical training; (7) Commissary privileges to married men; (8) Free clothes; (9) Free board and lodging; (10) 4 per cent interest on all deposits made with the Government.

The following are the rates of pay in the Army: (1) Private, $30; (2) Private, first-class, $33; (3) Corporal, $36; (4) Sergeant, $44; (5) Sergeant, Aviation Mechanician, $66; (6) Sergeant, first-class, $51; (7) Sergeant, first-class, Aviation Mechanician, $73.50; (8) Master Signal Electrician, $81, and (9) Master Signal Electrician, Aviation Mechanician, $121.50.

Comparisons in Pay

Compare the above rates of pay in the Army with what the Department of Labor states as the average pay of the civilian from twenty to twenty-five years of age, which is $885 per annum, or about $75 per month. It will cost this man about $71 a month, living expenses, itemized as follows, and it will be noticed that the amounts are very conservative:

(1) Room and board, per month	$30.00
(2) Cost of clothing, per month	9.00
(3) Cost of shoes, hats, ties, and miscellaneous expenses	3.00
(4) Medical and dental attention, hospital and medicines	5.00
(5) Loss of time due to holidays, sickness, etc., 2 days per month	9.60
(6) Loss of time due to lack of employment, on account of inclement weather, lack of material, change in position, etc.	14.40
Total cost per month	$71.00

At the end of the month he has in his pocket the difference between $71 and $75, or $4, whereas, in the Army the actual money received on pay-day is clear velvet, and none of his living expenses have to be paid out of it.

Chances of Advancement

The chances of advancement in the Air Service are excellent. A good, bright, energetic and active young man with initiative and force should not remain a private long. For aptitude, attentiveness, willingness and ability, a man should soon be promoted to the grade of non-commissioned officer. The following table shows the chances of promotion in a squadron of one hundred and fifty men, or rather it shows the number of non-commissioned grades that are available, and to which men enlisting in the Air Service can be promoted:

(1) 4 Master Signal Electricians.
(2) 29 Sergeants, first class.
(3) 33 Sergeants.
(4) 48 Corporals.
(5) 12 Privates, first-class.
(6) 24 Privates.

With respect to the various activities that are carried on in the Air Service, it is desired to bring attention to the fact that the following types of tradesmen are required:

Wireless telegraph and telephone, radio electricians, airplane mechanics, aero motor mechanics, propeller makers, fabric workers, magneto repair men, instrument repair men, carpenters and cabinet makers, machinists and tool makers, metal workers and welders, coppersmiths and vulcanizers, photographers, draftsmen, bench mechanics, chauffeurs.

Recruiting Offices in the U. S.

Aberdeen, S. D., Hatz Block Bldg., Lt. Col. Stanley L. Ross.
Albany, N. Y., 543 Broadway, Col. Oliver H. Dockery.
Atlanta, Ga., Transportation Bldg., Col. E. S. Wright.
Baltimore, Md., 16 St. Paul St., Col. Marcus D. Cronin.
Birmingham, Ala., 201 Clark Bldg., Lt. Col. Henry W. Bunn.
Boston, Mass., 12-A Tremont Row, Maj. F. B. Shaw.
Buffalo, N. Y., 15 W. Swan St., Col. M. K. Barroll.
Chicago, Ill., 526 So. State St., Col. Ivers W. Leonard.
Cincinnati, O., 612 Vine St., Col. John J. Miller.
Cleveland, O., 54 Public Square, Col. Ed. A. Shuttleworth.
Columbus, O., 153 North High St., Lt. Col. M. C. Smith.
Dallas, Texas, 107 Main St., Col. Geo. M. Grimes.
Davenport, Iowa, corner 3rd and Brady Sts., Col. Paul M. Goodrich.
Denver, Colo., 1705 Lawrence St., Lt. Col. C. N. Barney.
Detroit, Mich., 221 Woodward Ave., Col. J. C. McArthur.
El Paso, Texas, 218 West Franklin St., Lt. Col. Albert A. King.
Evansville, Ind., 624½ Main St., Lt. Col. L. W. Moseley.
Grand Rapids, Mich., 211 Monroe Ave., Col. Ralph McCoy.
Greensboro, N. C., 334½ S. Elm St., Lt. Col. Edwin Butcher.
Harrisburg, Pa., 325 Market St., Col. J. B. Kemper.
Houston, Texas, Binz Bldg., Col. Jos. F. Gohn.
Huntington, W. Va., Robson-Princhard Bldg., Col. Pearl M. Shaffer.
Indianapolis, Ind., 53 South Illinois St., Maj. T. F. Ryan.
Jackson, Miss., 223 West Capitol St., Col. W. D. Forsyth.
Jacksonville, Fla., Barnett Bldg., Lt. Col. Walter J. Buttgenbach.
Joplin, Mo., 112 Fourth St., Col. F. G. Knabenshue.
Kansas City, Mo., 203 Twelfth St., Col. Hugh D. Berkeley.
Knoxville, Tenn., cor. Market and Union Sts., Col. Wm. A. Kent.
Lexington, Ky., 139 East Main St., Col. H. H. Pfeil.
Little Rock, Ark., Donaghey Bldg., Col. Walter S. McBroom.
Los Angeles, Cal., San Fernando Bldg., Col. Alexander M. Wetherill.
Minneapolis, Minn., 311 Nicollet Ave., Col. Chas. W. Castle.
Nashville, Tenn., 155 Eighth Ave., North, Col. Wm. Newman.
Newark, N. J., 86 Park Place, Col. J. A. Irons.
New Orleans, La., 106 Camp St., Col. Wm. G. Fleischauer.
New York, N. Y., 461 Eighth Ave., Col. Wilber E. Wilder.
Oklahoma, Okla., 104½ W. Main St., Col. Reuben Smith.
Omaha, Nebr., Army Bldg., Major R. E. Frith.
Peoria, Ill., 104-106 N. Adams St., Col. E. W. Tanner.
Philadelphia, Pa., 1345 Arch St., Col. Jos. A. Gaston.
Pittsburgh, Pa., 649 Smithfield St., Lt. Col. H. G. Stahl.
Portland, Me., 51½ Exchange St., Lt. Col. Philip Powers.
Portland, Ore., Worcester Bldg., Col. S. A. Kephart.
Providence, R. I., Ceaser-Misch Bldg., Col. Allen D. Raymond.
Richmond, Va., 820 E. Broad St., Col. Jno. McBride, Jr.
St. Louis, Mo., cor. Third and Olive Sts., Col. Cornelius C. Smith.
Salt Lake City, Utah, Central Bldg., Maj. A. R. Emery.
San Francisco, Cal., 660 Market St., Lt. Col. J. H. Gardner.
Savannah, Ga., 35 Barnard St., Col. J. E. Wyke.
Scranton, Pa., 507 Lackawanna Ave., Col. Leonard T. Baker.
Seattle, Wash., Mutual Life Bldg., Col. James T. Watson.
Spokane, Wash., 409 Ziegler Bldg., Col. R. M. Brambila.
Springfield, Mass., 17 Hampden St., Col. B. P. Nicklin.
Syracuse, N. Y., 107 Bastable Bldg., Lt. Col. R. R. Wood.
Toledo, Ohio, Darst Block, 416 Adams St., Col. Chas. H.
Wichita, Kansas, Bitting Bldg., Col. C. E. Ide.
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(*Continued from page* 5)

and take advantage of this chance before their transatlantic rivals.

If this is to be done it is evident that a prompt start must be made. Our European rivals are already on the ground, and the South Americans are in a receptive mood as may be seen from the following items of news:

The Situation Today

On April 6 Lieut. Cortines of the Chilean Army, in a British machine, flew over the Andes mountains at a height of 19,600 feet. The first flight across the Andes in an airplane was made just a year ago (April 15, 1918) by Lieut. Candelaria of the Argentine Army. He took the air at Zapala, Argentina and landed at Curco, Chile, 112 miles distant. The highest altitude reached was 10,500 feet.

The Vice President of Brazil, *ad interim*, has officially authorized, by decree No. 13417, of January 15, 1919, the opening of a special credit to the Ministry of War for an amount of 2,000 contos of reis (about $500,000 in American currency), to be used in organizing an aviation service, buying aeroplanes, establishing aviation schools, and purchasing various accessories.

A military aviation school is to be established in Peru, according to a recent decree. The following regulations concerning the new school appeared in *El Commercio*, of Lima, of January 30: It is proposed to establish a center of aviation in each military region, but at first there will be established only the " Center of Aviation of Lima." Until the aviation service has become sufficiently strong, it will be a dependent part of the engineering service of the army. The personnel of this service is to be taken from officers of the regular army and of the navy, from the reserves of all branches of military service. Such officers chosen will keep the uniform of their respective branch of service, only wearing a distinctive insignia of the aviation service. Each center of aviation is to have a director, contracted by the Government (probably a foreigner who has seen service in the recent war).

British and Italians Active

Argentina appears to be receiving a great deal of attention today as a field for aerial services and for the construction of aeroplanes. The representatives of several aeroplane manufacturers, British and Italian, have arrived in Buenos Aires, according to recent advices, and others are coming soon. Major Ivor M. Bellairs, R. A. F. and Bruce Douglas, representing the Handley Page, Ltd., London, have been received in audience by the President of the Republic, to whom they outlined their intentions regarding the institution of commercial aeroplane services in this country. Despatches from London to Buenos Aires say:

" The National Aircraft Manufacturing Company is sending out by the next mail steamer Major Shirley Kingsley, of the British Royal Air Force, with a passenger aeroplane which he will use for the purpose of an active propaganda. The aim in view is to install in Argentina a system of aerial transport for which purpose it has already been planned to build an aeroplane factory in Buenos Aires. Major Kingsley already knows Argentina, having resided there for some time on the staff of one of the railway companies before he returned to his country to volunteer for the army, which he entered as an aviator obtaining subsequently the Military Cross for bravery in aerial combats. For their part, the Handley Page Company has presented a proposal to the Argentine Government for the establishment of an extensive service of mail and passenger transport, with fixed itineraries between Buenos Aires and Mar del Plata, Montevideo, Bahia Blanca and Rosario. The Nieuport Company is sending Lieutenant Chapman of Rosario to Argentina with a military type aeroplane.

Major Scott Gosport, of the school of Instruction and British member of the military mission sent to the United States will shortly visit the Argentine Republic, taking with him two flying machines with the intention of offering his servces to the Argentine government as an instructor.

International Air Code

The proposed convention regarding international aerial navigation has been completed by the judicial and military sub-committees of the aeronautic commission of the peace conference, on which Brigadier General Benjamin D. Foulois, Major Pollock and Captain Bacon represent the United States.

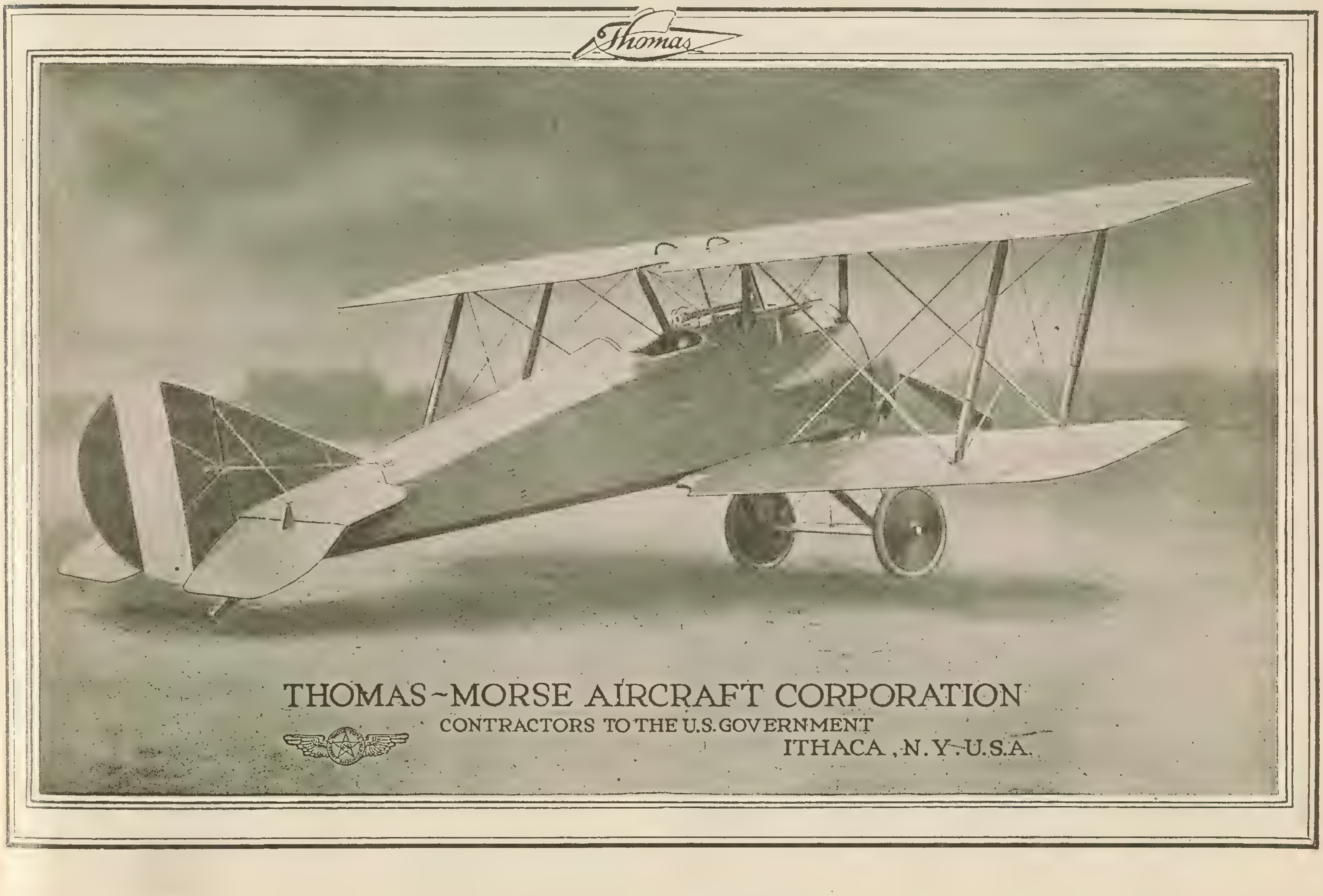
The convention is composed of forty-one articles, which establish an international agreement on sovereignty of the air, provide for the concession of inoffensive voyages between the contracting states and deal with forbidden zones and also international aerial routes.

An international commission on aerial navigation is to be formed. Its duty will be the gathering and disseminating of radio-telegraphic, meteorological and medical information.

N. A. C. to Erect Laboratory

At a meeting of the National Advisory Committee for Aeronautics, on April 10, the construction of an engine dynamometer laboratory was authorized. The laboratory will be erected on the Committee's plot at Langley Field and will cost approximately $15,000.

The purpose of the laboratory is to test internal combustion engines, conduct researches and advance the development in aircraft engines. The study of related problems, including the co-relation of engine performance in free flight with the results obtained on the test stand, will also be made.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Gen. Wm. Mitchell, C. M. G.

Brig.-Gen. William Mitchell, Chief of Training and Operations Group, Army Air Service, has been notified by cable from General Trenchard of the Air Ministry that he has been awarded the C. M. G., that is, made a Companion of the Order of St. Michael and St. George.

The high honor just conferred by the King of England makes the sixth decoration awarded to General Mitchell for meritorious service during the war. He has received a Croix de Guerre with a star and two palms designating subsequent citations, the decoration of a Commander of the Legion of Honor and the American Distinguished Service Cross.

General Mitchell went overseas when a Major as a Military Observer of the American Military Mission before General Pershing or any of the American Expeditionary Forces arrived, and returned as a Brigadier-General to succeed General Kenly as Director of Military Aeronautics. In the reorganization of the Air Service under General Menoher's direction, General Mitchell is now charged with the Operations and Training of the Army Air Service.

General Mitchell has the distinction of being the first American officer to participate in the fighting at the front with the French and British forces and was the first American officer representing the American Army to receive the Croix de Guerre.

He entered the Army after service in the Spanish war. He was commissioned a First Lieutenant in the Signal Corps in 1901. After graduating with distinction from the Army School of the Line in 1908, he then attended the Army Staff College and was one of the youngest officers to complete the course. General Mitchell received his rating as a Junior Military Aviator in July, 1917: he became a Colonel on August 5, 1917, and a Brigadier-General Nov. 1, 1918, and was Chief of Air Service, 3d Army of Occupation at the time of the Armistice.

Training in Marine Aeronautic Corps

The first aviation unit organized in America and sent abroad using American-made material was the First Marine Aeronautic Company, equipped for water flying only, which is now stationed abroad at a naval base. This information is given in an announcement of the progress of Marine Corps aviation, which has just been made public at Marine Corps headquarters.

In addition to the flying field maintained at Miami, Fla., where all training in actual flying is given, the Aviation Section of the Marine Corps gives candidates instruction in ground work at the Massachusetts Institute of Technology, Boston, Mass., and has two schools for instruction in aviation mechanics.

At present the Marine Corps aviation forces in France, equipped for land flying only, are performing pursuit, combat, bombing and reconnaissance duty. In addition they are performing duties which involve actual flying with heavier and lighter than air craft, the former consisting of pursuit, combat and gunnery machines, seaplanes and flying boats. Kite balloons are used in performing the duties connected with lighter than air craft.

An Aviation Section is maintained at headquarters, United States Marine Corps. All selections for the personnel of the Marine Reserve Flying Corps are made by this office. It also makes all requests for material for the use of the Aviation Section obtained from the Army and Navy. It is estimated that in addition to the personnel at present attached to aviation, it will need 1500 officers and 6000 enlised men to carry on the work assigned to the Aviation Section of the Marine Corps during the next year.

The Aviation Section of the Marine Corps will be called upon to furnish replacements for duties abroad. Since the recent arrival of marine aviation forces in France, the operations have been very successful. One officer has been recommended for the distinguished service cross and medal of honor for bringing down enemy planes.

Answers to Correspondents

All bona fide inquiries will be answered by letter to the inquirer and included in these columns. Questions should be accompanied by stamped addressed envelopes.

A. M.—How is the Factor of Safety in an Airplane Determined?

The determination of the factor of safety in an airplane is somewhat lengthy, involving a great deal of work in computation. From wind tunnel tests the leads borne on the wings under various flight conditions are ascertained. A stress analysis is then made of the wing truss in accordance with the principles of applied mechanics, with special modifications to meet airplane conditions.

B. R. S.—In the "K" system of bracing, since the lift of the upper surface of the biplane is greater than that of the lower surface, an unbalanced force may be introduced into the main front strut of the "K" truss.

M. W. S.—Major Horace M. Hickam, Chief of Information, Executive Staff, Department of Military Aeronautics, Washington, D. C., undoubtedly will be glad to answer your question concerning the policy of the Department in the matter of pilot training in universities.

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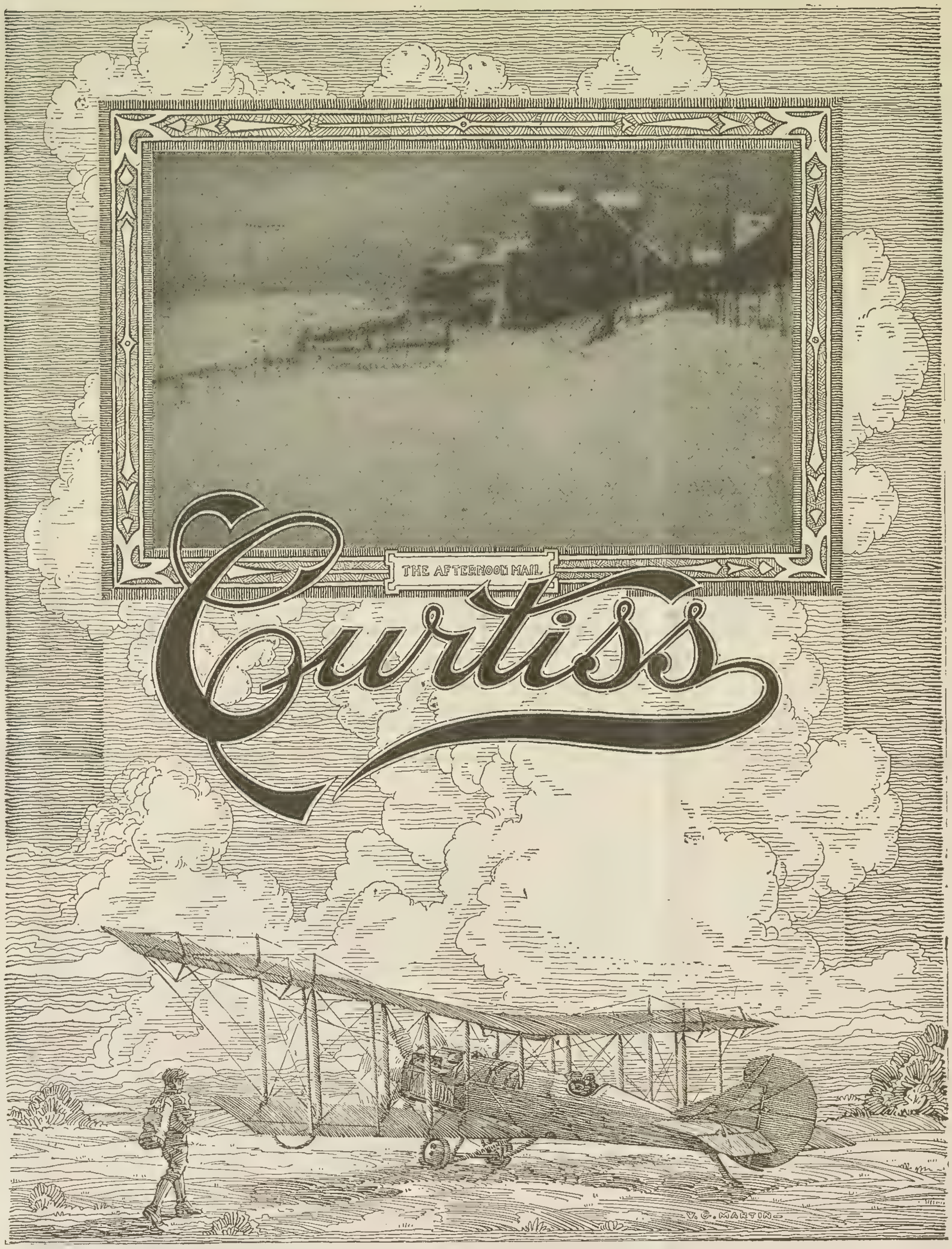

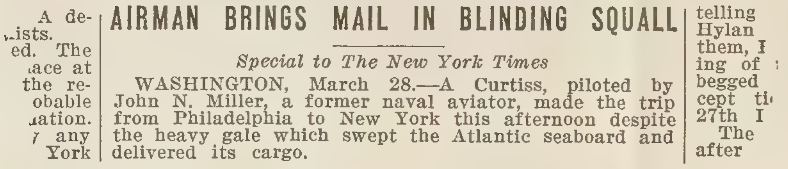

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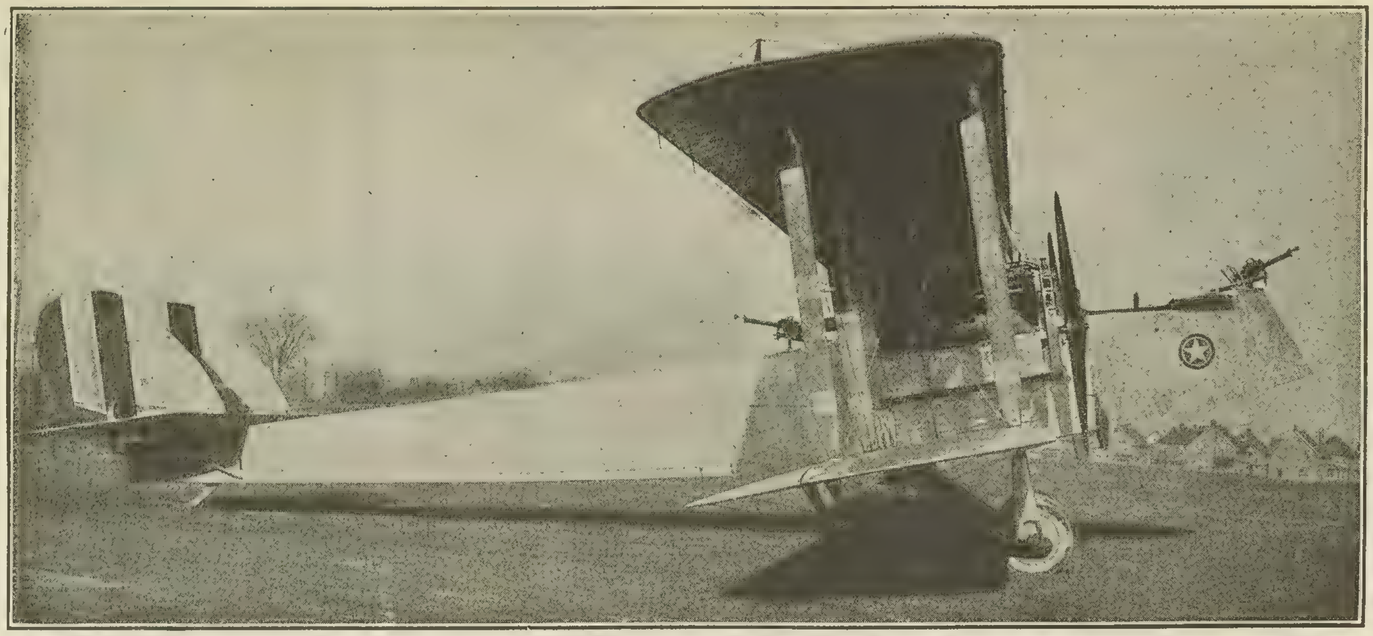

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An Independent Air Service?

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Those For And Those Against Advance Strong Reasons In Support Of Their Position

Shall the United States have an Air Service independent of the Army and the Navy? On the answer to this question depends some of the most important decisions that will be made by the next Congress. If it is decided to continue to have the Air Services integral parts of the Army and the Navy and administered by officers of these services, the expansion of the arm will probably be along highly specialized lines. If, however, the opinions of those who believe in the independent service idea prevail, a development paralleling the large naval program may be looked for.

There seem to be four distinct groups in Washington who are making plans for the future of the Air Service. The Navy Air Service is entirely opposed to amalgamation with any other branch, pointing to the excellent record made during the war by this section of the Navy Department. They consider the problem of the Navy in its relation to aeronautical development to be one that those with naval experience should determine. It is felt that unless the personnel and equipment that are to serve with the fleet or for coastal patrol are navy trained that the best results will not be obtained. The difficulties experienced in the British Royal Air Force in melding the naval air personnel with the other branches is pointed out. At the present time a Board of Admirals is giving the whole question of the Naval Air Service most careful study and it is expected that when Congress meets it will have a definite project to submit.

Wide Difference of Opinion

The officers of the Army Air Service forming the second group have no such unity of thought as in the Navy. Here the widest divergence of opinions is met. When General Kenly became the champion of a separate Air Service and ran into the reactionary policy of the General Staff, he was relieved from duty. There were other contributing causes without doubt, but it serves as an object lesson to other officers and will have a tendency to restrain the frankest discussion. There are many officers of the Army who have been detailed to the Air Service from other arms who believe that owing to the lack of understanding of the airplane and its limitations, officers of the other branches cannot secure the maximum value from the air forces without long training.

The officers from civilian life who served in the Air Service and found themselves tied in knots by the red tape of the army which was put in effect as the result of years of ingenious planning for the regular Army are almost a unit in favoring some more direct method of handling the Air Service than through the intricacies of present military channels. They also have seen the difficulties in securing authorizations which were obviously of the greatest and immediate importance from officers who had very little conception of the requirements of the Air Service. The lack of a civilian director who knew the problems of the service and could act as its spokesman was also found to be a great handicap, especially in dealing with the public. So many persons were giving out information which was fanciful that the reaction was unfortunate.

General Staff Plan

The third group that is making plans for the future of the Air Service is the General Staff of the Army. From all the announced plans of this body, it is clear that it desires to subordinate the airplane to the same position as the Tank and Motor Transport branches. By not securing authorization for the Air Service to be recognized as a separate corps, it is now necessary for the men who want to go into the Air Service to enlist in the Infantry and then be transferred to the Air Service.

All officers in the future according to the plan of the General Staff will have to be members of another arm of the service and be detailed for a period of a few years to the Air Service. Obviously such plans are not to be accepted without the greatest opposition by all who appreciate the possibilities of an air fleet. But the condition which has made this program possible is not likely to be of long duration. When the General Staff, A. E. F., returns and officers who have by experience in action learned the supreme importance of air service troops, it is expected that a more liberal policy will prevail.

Congressional View

The fourth group that is making plans for the permanent organization of the Air Service is within Congress. There seems to be little doubt that a strong effort will be made to put into effect a law to create a separate Air Service. The congressman's point of view seems to be that if the airplane is to become the force it has demonstrated that it can be made in war it is not good policy to have various branches of the government asking for large appropriations and then competing with each other in the purchase of equipment. There is also the experimental development to be considered. With millions of dollars asked for by the Army and Navy to carry out elaborate experiments and purchase separate experimental plants, not to overlook the building up of two highly technical staffs of aeronautical engineers, the congressman takes the point of view that this is unbusinesslike and wasteful. Then there are the postal appropriations to be taken into consideration and also the uses that can be made of the Air Service equipment in other departments of the government. Above all these considerations is the impression that the Air Service has now grown to be an arm that has a reason for an independent existence, the same as the Navy.

If the Secretaries of War and the Navy were to make a joint recommendation which would eliminate the competitive features of their programs and consolidate the experimental work, Congress might listen with more consideration to the Army and Navy retaining their Air Services as integral parts of the present establishments. A combined appropriation for Air Service will probably be worked out in some way and if the plans can be submitted jointly they may hold off the plan for an independent service.

Careful Consideration Necessary

The discussion as to the advisability of an independent service is made more difficult by differences of opinion among the officers who have served at the front and seen the operation of aerial forces. The arguments of these men should be given the widest discussion and most careful consideration. Those who believe in the independent air force can present tactical programs of the most carefully thought out completeness. Their opinions will receive the most serious study.

Generally, the reasoning that leads to the conclusion that a separate Air Service is advisable follows the broadest conceptions of the future of the Air Service. It is based on the fundamental fact that the mission of the Air Service in war is to destroy the air power of the enemy. This promise leads to the conclusion that an independent force must be available to go and seek out a hostile air fleet wherever it is found over land or over sea. To do this successfully, the strategy must be based on an independent Air Service—one that has independent means of information, supply and authority. To extend this to operations over the sea, it is pointed out that the tactics to be used in naval operations are essentially the same as those over land owing to the employment of floating airdromes, some of which are now in existence in the Royal Air Force.

Fast and Nimble Planes

The belief is becoming general that supremacy in the air is to go to the force having the fastest and most maneuverable fighting planes. This applies to naval warfare as well as to land combat. The concentration of a powerful force of airplanes in any area will tend to give the aggressor an opportunity to make use of all forms of aircraft and utilize all means of aerial attack. Given sufficient types and supremacy of numbers the result will be in favor of the power having the strongest independent air force.

To accomplish this result there must be unity of command and development of a separate acting power. In order to supply the army and navy with the units required for observation and liason, a service would be built up but it would be distinct from the employment of air units as a separate arm. The training of such service units would be under the independent air force and the equipment would be developed by the expert engineers of the independent air force, but in war they would be assigned and operate under the branch of the army and navy requiring this specialized service.

Against the above conception of the independent air force, is to be placed the opinions of those who believe that the limitations of the airplane make it useful primarily as a means of observation and having limited combat value except against its own kind. These strategists would subordinate the air units to the branches of the service with which they are employed. The artillery would develop a highly specialized service of observation and fire control. The Navy would have its fleet air equipment developed by specialists and the coastal patrol would have still another complete unity of personnel and equipment. The infantry in all its commands would have highly specialized air equipment and personnel. Acting in connection with these arms and under their direction would be the pursuit and bombing groups which would operate in connection with the other arms and as a part of their strategy.

Unity of Command

Those who would have the Air Service remain as part of the Army and Navy believe that unity of command is essential in all operations. They feel that this should apply broadly to the Army and Navy as well as the Air Service. The tendency in Great Britain to have a Minister of Defense who will control the military, naval and aerial forces is pointed to as a step in the direction of unified control. While the President in time of war is in effect the co-ordinator of all arms and can give practical independence to any service, it has never worked to the end of successful joint action.

Such widely divergent ideas will require much study to determine which have the soundest basis of fact. As all these problems will be presented to Congress soon after it convenes, the widest discussion should be given to the matter, so that all sides may be presented and given consideration.

Maintaining the Air Service in Peace Time

How Local Organizations, Universities and Technical Schools Can Cooperate with the Government to the Advantage of Both

By Col. Thurman H. Bane

The main problems of the Air Service in peace time are the maintenance of a personnel which can be readily and rapidly increased to the huge requirements of war time, the continuation of experimentation and improvement in design, and preparation for immediate production on a large scale of the best designs available.

It is possible to achieve these objects without the maintenance of a large permanent air force in the United States, which is fundamentally unsound, and would be fought on very reasonable grounds by advocates of disarmament and by all those who have well justified hopes in the establishment of a league of nations. At the same time there would be few to object to the organization of a small, efficient, capable, highly educated permanent air force which would achieve the above objects with a minimum expenditure in money and men.

First there is the question of the flying personnel. This is readily solved by placing the bulk of the air force in the Reserve, and by promoting facilities for the training of this Reserve. The difficulties of training this Reserve are not as great as would seem at first sight provided the co-operation of two types of organizations is secured.

Securing Local Co-operation

The first type of organization whose co-operation is to be sought, is the Chamber of Commerce and the Commercial Club. The second type is the University and the Technical School which are in a position to provide such excellent human material.

By proper educational and publicity program, Commercial Clubs and Chambers of Commerce should be induced to give the Air Service a landing field near all of our big cities—this is in case the government did not care to provide them. This field should have the necessary hangars, quarters, small shops, etc. A commanding officer should be assigned from the regular Air Service; also an engineer officer and from three to five flying instructors, and a medical officer, and about twenty-five training planes and eighteen service type planes, for a one-squadron station. The station would be required to train a prescribed number of aviators per year. From one to four squadrons of the regular Air Service should be provided to care for airplanes and equipment.

Would Keep Fliers in Training

These flying fields would accomplish several valuable things from the point of view of flying personnel. First they would furnish an opportunity for the aviators now in the Air Service and who return to civil life to continue flying in the early morning and evening, so as not to interfere with their business. A former Air Service pilot would go out to the airdrome, spend the evening looking over the latest performance charts of the type of airplanes and of the data, regularly provided by the Technical Division of the Air Service; remain over night, get up early and take a flight, and get back to town in time for work. Such fields should be made attractive, like country clubs, with comfortable arrangements for sleeping quarters. Many a former pilot would enjoy flying under such conditions and remain in flying trim. It should be added that while the cities and chambers of commerce would provide the fields, the government would provide buildings, equipment and maintenance.

To Train Technical Graduates

These flying fields would also provide suitable training for new members of the Reserve Air Force, who would be graduates of ground schools to be established permanently at various universities and technical schools. Arrangements for the organization of such permanent ground schools are already being energetically made, and the universities are intensely interested in their establishment. When the young engineer graduates at some school, such as Columbia University, he will receive a certificate of qualification in the course in aeronautics. Upon presenting this to the Commanding Officer of the airdrome at Detroit, where he has gone into the automobile business, he could receive his flying instruction, upon the completion of which he could be commissioned a 2nd lieutenant in the Air Service Reserve. This system would give the country at a minimum cost an efficient air service composed of the best young blood of the country.

Col. Thurman H. Bane, in Charge of Engineering on the Technical Advisory Staff of the Director of Air Service

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3750 New R. M. A.'s a Year

It is roughly estimated that every city of over 100,000 population could maintain at least one training squadron, probably one for each 100,000 of its population. This would call for, roughly, 75 of these squadrons at 50 stations. Each squadron should train fifty aviators per year as a minimum; more time naturally being allowed than where the student devotes his entire time to flying instructions. This would result in 3750 new reserve aviators each year. The 18 service machines would give 150 trained aviators about fifty hours per year, even under the most disadvantageous weather conditions. Considering two hours' flying per day for only nine months per year, 75 squadrons would provide facilities for 11,250 trained aviators to keep up their training.

To recapitulate, 75 reserve squadrons in 50 cities would give us 3750 newly trained aviators per year and provide facilities for 11,250 trained aviators to keep up their training. Seventy-five Air Service officers would be required to command such stations and additional squadrons. Also 50 engineer officers and 375 flying instructors would be required. Seventy-five squadrons of enlisted men would probably be required unless a number of civilian mechanics were employed. An initial equipment of 1875 training planes, 1310 service planes would be required at a cost of approximately $16,000,000. It is thought that this equipment is now available. The initial equipment is usually the hard thing to get. When a project is once started, it is thought that funds for replacement can easily be obtained.

$12,000,000 Cost a Year

It is probable that training plane requirements would be approximately normal, but service plane requirements would be high, due to such a large number of fliers using the same machine, and the fact that they would do comparatively little flying. Training plane replacements would be about 50 per cent per year or about $4,000,000. Service plane replacement would probably be 100 per cent per year or $8,000,000. In other words, it would cost $12,000,000 per annum for plane equipment to keep 11,250 aviators in training and to train 3750 new aviators. This appears to be an extremely reasonable figure, $800 per aviator; of course, there would be many other items of cost to be added.

Incidentally these fields would be of great service to the Postal Air Mail Service.

Would Aid Experimental Work

But these flying fields would also aid greatly in solving the second great problem of the Air Service, the continuation of experimentation and improvement in design. It is considered vital that the interest of manufacturers who have been engaged in aviation production be kept alive. Most of them will no longer produce aircraft, but some of them would undoubtedly be willing to carry on a little experimental work with the proper government encouragement and the provision of a suitable flying field in the vicinity of all manufacturing centers. Besides being a great incentive to commercial flying and cross-country work, these flying fields would therefore encourage the manufacturer to keep working.

New Types Being Designed

The Technical Division is, of course, even now working energetically on the design of new machines, and also encouraging the manufacturers by placing suitable orders with them for experimental and service planes. There is little to be feared on the score of improvement in design. In encouraging manufacturers, the following system is

(*Continued on page 14*)

First Non-Stop Flight from Chicago to New York

Capt. E. F. White, in the DH-4 Often Used by Major Ocker, Covers the Air Route of 725 Miles in 6 H. 50 M.

The first non-stop air flight from Chicago to New York was accomplished Saturday, April 19, by Capt. E. F. White, U. S. Air Service, who covered the air route distance of about 725 miles in six hours and fifty minutes.

The flier, accompanied by H. M. Schafer, a civilian mechanician, left Ashburton Field, his starting point, at 9:50 A. M., Central time, and arrived at Hazelhurst Field, Mineola, L. I., at 5:40 P. M., Eastern time. It was one of the smoothest flights ever made in America, and was not marred even by the most insignificant hitch.

The machine used was a De Haviland-4, with a 12-cylinder Liberty engine. It carried its gasoline capacity of 194 gallons.

Capt. White made an easy landing, and appeared to be exceedingly fresh after his long trip in the air. He had dinner with the officers at the aviation field, and then came to the Hotel Astor.

Intended to Keep Flight Secret

"I had intended," he said later, "to keep the flight a secret, but news of my intention got out long before I had decided on the day for the start. The trip was not made in my official army capacity, but, of course, I was compelled to get permission from the authorities at Washington before I could attempt it.

"When Schafer and I left Ashburton Field, in addition to our compasses and other necessary flying paraphernalia, we carried maps or pictures of well known landmarks along the route. We used these as guides during the journey.

"The weather was ideal from the beginning of the voyage. We gave our machine an inspection and then went up. There were no opposing wind currents from the outset and we quickly rose to an altitude of 12,000 feet, which we maintained during the trip. Not once did we encounter rain or snow, or one bit of weather that caused us the least inconvenience. The engine worked perfectly, and not once were we compelled to give it more than the ordinary attention required in long flights.

"We maintained about the same rate of speed throughout the flight, and were able to discern our 'guide posts' without any difficulty."

The aviator referred to his motor as being "very fine," and said it could not be beaten.

Overcoming Take-Off Difficulties

Capt. White provided a sure cure for soggy, dangerous starting fields. When he prepared to leave Ashburton Field, he found the turf so damp the wheels of his heavy plane sank deep into the mire.

A load of cinders was obtained and the plane shifted to the more solid foundation. Mechanics held the plane back until the motor reached its maximum speed. Then the plane was released, and it climbed almost straight up instead of running along the soggy earth. This feat was considered even more unusual because of the heavy load of 194 gallons of gasoline.

The record of Capt. White's flight has been presented for homologation to the contest committee as required under the rules of the International Aeronautic Federation, which passes on all records. The airplane he used was the regular type of De Haviland-4, equipped with a 400 hp. Liberty engine, with special tanks.

Learned to Fly in 1917

Capt. White was born at Minneapolis, is 30 years of age and learned to fly in 1917 at the Army school at San Diego. He is in charge of plane and engine maintenance at McCook Aviation Field, Dayton, Ohio, and has established several cross-country flying records. The day before making the flight from Chicago here he flew from Dayton to Chicago, and on March 7 flew to New York from Dayton.

Army aviation officers discussing the flight expressed the opinion that the De Haviland-4 airplane of the type used by Capt. White is capable of a cross-ocean flight. They are convinced that the De Haviland, with her Liberty engine and the addition of larger gasoline tanks, could easily make the "big hop" across the Atlantic.

In this connection it was pointed out that Capt. White, had he cared to do so, could have continued his flight 225 miles on the gasoline supply with which he started from Chicago. This would have been equivalent to half the distance across the Atlantic between St. John's and the Irish coast. The Army fliers pointed out that the simple addition of slightly more than 200 gallons of gasoline to the De Haviland's supply would fit her for the cross-ocean flight.

Major Ocker's Machine

At Dayton, Ohio, Brig.-Gen. William Mitchell, Chief of Training and Operations of the Aviation Section of the Army, said:

"The feat accomplished by Capt. White in less than seven hours is positively marvelous."

Capt. White, he added, obtained permission to make the trip to Chicago and thence to New York on the spur of the moment and was on his way in fifteen minutes.

The plane used is one previously piloted by Major W. C. Ocker, of General Mitchell's staff. It was in an accident at New Philadelphia, Ohio, a few days ago, and had just been repaired and tested at McCook Field.

Captain White arrived at Bolling Field, Washington, from New York at twenty minutes past one o'clock Monday, April 21, having made the trip in an hour and fifty minutes.

Captain White, before returning by train to Chicago, made a report on his flight to War Department officials. His airplane was turned over to the army authorities.

Members of the Japanese Naval Mission, headed by Admiral K. Yoshida, I. J. N., Inspecting the Vought VE-9 U. S. Army Standardized Training Airplane at the Central Park Flying Field, L. I.

World's Loop Record Broken

The *Plane News*, published by the Air Service, A. E. F., has announced that Lieut. T. H. Joyce, test pilot with a Morane monoplane, equipped with a 120 hp. J. B. Le Rhone motor, looped the loop three hundred consecutive times on Jan. 24 at Issoudon, France. This remarkable feat was accomplished at an average altitude of 2000 feet and was in constant sight of the witnesses on the field.

Lieutenant Joyce left the ground in his Morane at 1:51¾ p. m. and climbed until his altimeter registered 2000 feet, then proceeded to imitate a cart wheel. After the score passed the 200-mark the onlookers expected each succeeding one to be the last, yet it was not until the 300th loop that the unceasing circular sweep was stopped and the machine glided to the ground, making a perfect landing within 100 feet of the starting point. The plane was undamaged, with the sole exception that the engine bolts had been loosened. The total time the plane had been in the air was one hour and six minutes, and the only reason the exhibition stopped when it did was exhaustion of the gasoline supply.

The only time lost by Lieut. Joyce was about five minutes straight flying to warm the motor and obtain the desired altitude. It took 24¼ minutes to make the first 100 loops, while the second hundred but 20½ minutes, which was shortened to exactly 20 for the third, the average time per loop being 13¼ seconds.

The record of the flight, confirmed by affidavits of three timekeepers, has been forwarded to the Chief of Air Service for confirmation as an official record.

Major Macauley's Record

Major T. C. Macauley, commander of Taliaferro Field, who has flown from coast to coast in twenty hours at an average speed of 137 miles an hour, arrived at Fort Worth, Texas, safely April 18 from Jackson, Miss., where he spent the previous night. He landed in his plane at 11.30 a. m.

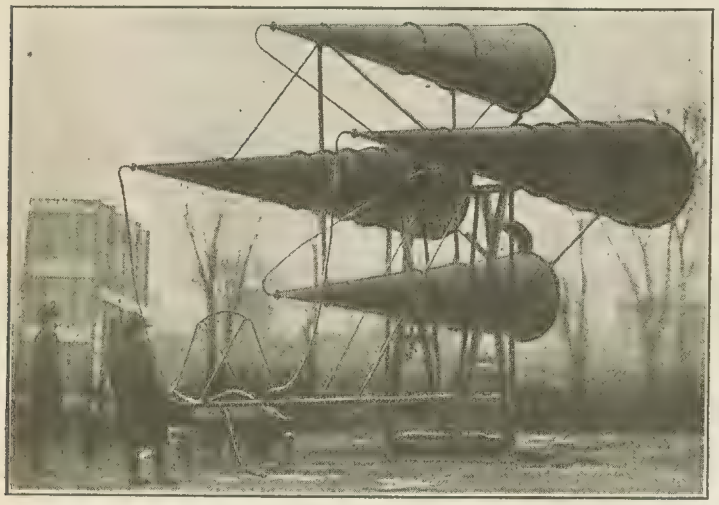
Major Macauley flew 5,500 miles in 44 hours and 15 minutes. His flying time across the continent from San Diego to Jacksonville was 19 hours and 15 minutes, setting a new record. Of this distance, 880 miles were covered without a stop. This was from Tucson, Ariz., to Sweetwater, Tex. He used a De Haviland plane with a Liberty engine. The motor, according to the airman, never missed a stroke, and the only work done was to remove two dirty spark plugs.

Macauley flew from Jackson, Miss., where he spent the night of April 17, to Fort Worth in 4 hours and 30 minutes. He had intended to complete his journey by moonlight, but feared he might be forced to make a landing in the Louisiana forests.

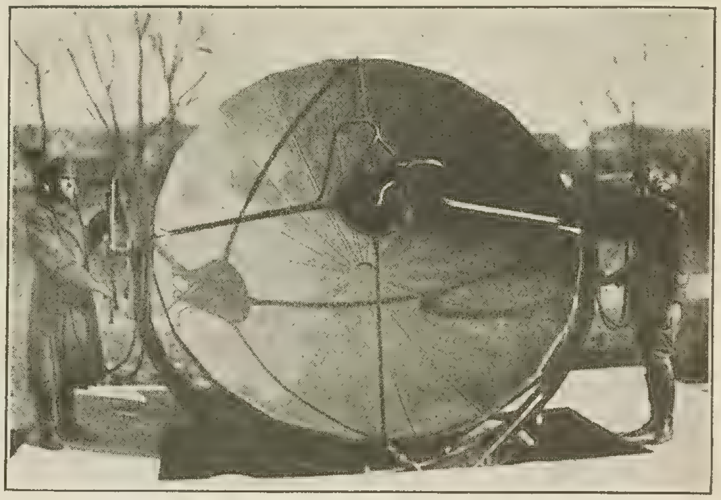
Notes on Technical Aeronautics

Devices for Locating Enemy Aircraft

During the war a number of devices were developed for locating enemy aircraft. These might have a certain utility in peace time. A flying field might be very anxious to know the exact whereabouts of a machine coming in under difficulties so as to be able to locate it under difficulties. The French first developed a long-horn listening device shown in the appended cut. This was however a cumbersome affair somewhat difficult to move. American engineers came to the rescue and developed an equally effective but portable apparatus of the parabolic type, with the famous Ford wheel and axle again in evidence, with plaster board detecting devices, at one-third the original cost. This is shown in the second photograph.



Long Horn Listening Device for Locating Enemy Aircraft



American Parabloid—A Development of the Long Horn Set

Solder for Aluminum

With the increasing use of aluminum and duraluminum in airplane construction the question is often raised whether they can be satisfactorily soldered, and if so by what methods and with what alloys. Aluminum and to a lesser extent its alloys can be welded quite satisfactorily by the oxygen-gas process, but often it is not desirable to heat the parts to be joined to the relatively high temperature necessary to weld them in this manner, owing to the resultant distortion of the parts and a means of joining at lower temperatures is sought. The Bureau of Standards has recently conducted a very thorough investigation of the problem and has come to the following conclusions:

All metals or combinations of metals used for aluminum soldering are electrolytically electronegative to aluminum. A soldered joint is therefore rapidly attacked when exposed to moisture and disintegrated. There is no solder for aluminum of which this is not true.

Joints should therefore never be made by soldering unless they are to be protected against corrosion by a paint or a varnish, or unless they are quite heavy such as repairs in castings, where corrosion and disintegration of the joint near the exposed surface would be of little consequence.

Solders are best applied without a flux, after preliminary cleaning and tinning of the surface to be soldered. The composition of the solder may be varied within wide limits. It should consist of a tin base with the addition of zinc or of both zinc and aluminum, the chief function of which is to produce a semi-fluid mixture within the range of soldering temperatures.

Suggested ranges of composition are:

Tin-zinc solders:
- Tin ....remainder
- Zinc ....15-20 per cent.

Tin-zinc-aluminum solders:
- Tin ....remainder
- Zinc ....8-15 per cent.
- Aluminum....5-12 per cent

The higher the temperature at which the tinning is done the better the adhesion of the tinned layer. By using the higher values of the recommended zinc and aluminum percentages given above, the solder will be too stiff at lower temperatures to solder readily and the workman will be obliged to use a higher temperature thus securing a better joint. A perfect union between solder and aluminum is very difficult to obtain.

The joint between previously tinned surfaces may be made by ordinary methods and with ordinary soft solder. Only the tinning mixture need be special for aluminum.

There is no reason why a good solder for aluminum need be brittle as several commercial varieties are and it is very undesirable that it should be so.

The tensile strength of a good aluminum solder is about 7000 lbs. per sqare inch. The strength of a joint depends upon the type and the workmanship. Much dependence should not be placed upon the strength of a joint.

Life Saving in the Air

An interesting article in the *Aeroplane* discusses the possibility of life-saving equipment in the air. It may be objected that provision of life saving equipment is objectionable because such provision would remind passengers of potential dangers and discourage them from making ascents.

It should be remembered, however, that passengers on transatlantic lines are not discouraged from making voyages because during boat drills they are obliged to wear life-belts and take up life-boat stations. Neither are railway travellers in any way concerned by the provision of appliances for putting the automatic brakes into operation, or at the sight of fire-extinguishers for use in emergency. On the other hand, they would probably decline to travel on ships or railways where life-saving appliances were conspicuous by their absence.

In the case of serious mishap to any locomotive vehicle, the most necessary measure is to get away from the source of danger, if no immediate remedy if available, and the possibility of "abandoning ship" will always have to be faced in the use of the airplane or the airship for commercial purposes, and the only possible way of getting out of an aeroplane when it is in the air is on one form or other of parachute. There is but little doubt that a line of aeroplanes properly equipped with parachutes for all the passengers would, other things being equal, receive greater patronage than a line of aeroplanes not so equipped, and people would speedily become as accustomed to donning parachute harness as they will be to putting on necessary warm flying garments.

In this connection a small technical point arises. Parachuting is not half so terrible as some people imagine, but the action of jumping out of the machine is even more repulsive than jumping into a swimming-bath in mid-winter. It is the natural revulsion against committing any action which seems like potential suicide, just in the same way that the average person would flinch from putting his head under a steam-hammer, although he might be perfectly confident that the operator would check its fall before undue pressure was put upon his skull.

For this reason it would be necessary, probably, for the parachutes of passengers to be so arranged that they would be put into operation by the pilot or other responsible member of the crew without any necessary action by the passengers, because it is quite conceivable that should a breakage or even a fire occur in mid-air, many passengers would fail to get together the necessary nerve to make the jump and they would find it less terrible to go down to their doom in an uncontrollable or possibly blazing aeroplane. On the other hand, an arrangement of this nature might be worth while to prevent the unnecessary use of parachutes by persons who became panic-stricken through the sudden stoppage of an engine or because of violent weather. This measure might also be necessary to prevent adventurous spirits jumping out of the machine at the end of a voyage as the most artistic and sensational method of alighting.

News of the Army and Navy Air Services

Air Service D. S. Ms.

The Distinguished Service Medal has been awarded to the following named American Officers of the Air Service in addition to Colonels Dodd, Chandler and Milling announced last week:

Col. R. C. Bolling, Air Service, U. S. A. (Deceased). For exceptionally meritorious and distinguished services. His service to the United States Aviation was distinguished for an accurate and comprehensive grasp of aviation matters, for a sound and far-sighted conception of the measures needed to establish an efficient American Air Service in Europe, for initiative and resourcefulness in attacking the problems of a young Air Service; for brilliant capacity in arranging affairs with Foreign Governments; for boldness and vigor in executing determined policies. In all of these he has rendered service of great value to the Government.

Col. Edgar S. Gorrell, U. S. A. For exceptionally meritorious and distinguished services. He rendered most excellent service as a member of the United States Aeronautical Commission charged with the selection of types of European Aeronautical material to be manufactured in the United States; and as the representative of the Air Service with the General Staff, American Expeditionary Forces. In the performance of his many important tasks he displayed good judgment, great energy, and showed that he possessed ability of a high order, which have been of invaluable service to the Government.

Col. John R. Thomas, Jr., General Staff, U. S. A. For exceptionally meritorious and distinguished services. As Chief of the Aviation Division of the Intelligence Section, he displayed unusual energy and skill in the collection and dissemination of information regarding the enemy's air forces. During part of the period covered by the Argonne-Meuse Offensive Operations, he acted as head of the Intelligence Section, and performed the duties of that position with marked ability and sound judgment.

Col. H. C. Whitehead, U. S. A. For exceptionally meritorious and distinguished services. During the period of organization of the American Expeditionary Forces, he rendered services of a superior order in the planning and the organization of the Air Service. As Chief of Staff, Air Service, he displayed sound judgment and great ability in solving the many problems with which he was confronted. Throughout the entire duration of the war, his high professional attainments and untiring zeal have materially promoted the efficiency of the Air Service.

Col. William H. Wilmer, Medical Corps, U. S. A. For exceptionally meritorious and distinguished services. As surgeon in charge of medical research laboratories, Air Service, A. E. F., since September, 1918, he has rendered most distinguished service. His thorough knowledge of the psychology of flying officers and the expert tests applied efficiently and intelligently under his direction have done much to decrease the number of accidents at the flying schools in France and have established standards and furnished indications which will be of inestimable value in all future work to determine the qualifications of pilots and observers. The data collected by him is an evidence of his ability, his painstaking care and of his thorough qualifications for the important work intrusted to him. His new methods, etc., for testing candidates for pilots will be of great importance.

Col. Thomas DeW. Milling, A. S.

Harris & Ewing

Col. Thomas de W. Milling, Air Service, Military Aviator, has just been advised through the Adjutant General that King Albert of Belgium has bestowed upon him the Order de Leopold, with rank of "Officier." This honorary distinction was conferred upon Colonel Milling as a token of the esteem of the King and in recognition of the valuable services rendered the common cause.

Colonel Milling is one of the first Army officers to fly, having trained with Colonels Arnold and Foulois, at College Park, in 1911.

In 1912 Colonel Milling made the high record of army flights with 431 flights. On March 23, 1913, he broke the American Army record for distance, covering 240 miles between Texas City and San Antonio in four hours and twenty-two minutes. When war was declared Colonel Milling was ordered to Washington, where he served until August, 1917, when he went overseas.

He was Air Service Commander, First Army, after going through the battles of San Mihiel and the Argonne as Chief of Staff for General Mitchell, then Commander, Air Service, First Army. He succeeded his chief when General Mitchell became Commander, Air Service, Army Group, comprising the Air Service of both the First and Second Armies.

Colonel Milling returned to the United States with General Mitchell in March, 1919, and is his assistant in the Training and Operations Group.

New Reserve M. A's

The following-named officers, having completed the required tests, are rated as Reserve Military Aviators, to be effective from the dates set after their respective names: Capt. William S. Reyburn, A. S. A., January 27; Capt. Daniel Buckley, A. S. A., March 28; Capt. William M. Marrs, A. S. A., March 28; First Lieut. Maurice L. Buell, A. S. A., March 14; First Lieut. Edwin A. Russell, A. S. A., March 14; First Lieut. Langhorne W. Motley, A. S. A., March 28; First Lieut. William H. McCullough, A. S. A., March 28; First Lieut. Tasso V. Orr, A. S. A., March 28; First Lieut. Robin A. Day, A. S. A., March 28; Second Lieut. Harold F. DeLacour, A. S. A., March 28; Second Lieut. Kenneth K. Wooling, A. S. A., March 28; Second Lieut. Mark D. Bohen, A. S. A., March 28; Second Lieut. William Scott, Junior, A. S. A., March 14; Second Lieut. Charles B. McNeil, A. S. P., March 28; Second Lieut. Roy M. Andrews, A. S. A., March 28; Second Lieut. William S. Blakely, Junior A. S. A., March 28; Second Lieut. Clifford C. Stevens, A. S. A., March 28; Second Lieut. Dewey H. Miller, A. S. A., March 29; Second Lieut. Edward E. Hildreth, A. S. A., March 29; Capt. Walter R. Lawson, A. S. A., March 24; Major Louis B. Knight, A. S. A., March 31; Capt. Albert C. Lord, A. S. A., March 31; First Lieut. Charles H. Schumacher, A. S. A., March 31; Second Lieut. Ivan L. Proctor, A. S. A., March 31; First Lieut. James B. Kelsey, A. S. A., March 29; First Lieut. Benton A. Doyle, A. S. A., March 15, and (former First Lieut.) Howard F. Baxter (A. S. A.), Dec. 19 (all 1919).

Honorably Discharged

The following officers are honorably discharged from the Service of the United States: Thomas J. Naughton, Second Lieutenant, A. S. A.; Charles R. Jacobus, First Lieutenant, A. S. A. P.; Harold R. Eyrich, Major, A. S. A.; Irwin Wheeler, Second Lieutenant, A. S. A.; Paul B. King, Captain, A. S. A.; Robert Marsh, Jr., Major, A. S. A.; Edwin J. Fredell, Captain, A. S. A. P.; Wilson S. Zimmerman, Second Lieutenant, A. S. A. P.; Edwin F. Kingsbury, Captain, A. S. A. P.; Alvin C. Goetz, First Lieutenant, A. S. A. P., and Charlie D. Coleman, Second Lieutenant, A. S. A. P.

Personnel Board Appointed

A Board of Officers to consist of the following personnel has been appointed to consider such matters affecting the personnel of the Air Service as may be brought before it: Col. Thomas De W. Milling, Military Aviator, Air Service Aeronautics; Lieut.-Col. Rush B. Lincoln, Air Service Aeronautics; Lieut.-Col. Daniel M. Cheston, Junior, Air Service Aeronautics; Major Horace M. Hickam, Junior Military Aviator, Air Service Aeronautics, and First Lieut. James A. Healy, Air Service Aeronautics, Recorder.

L. D. GARDNER. . .*President and Editor*
W. D. MOFFAT. . . . . . *Vice-President*
W. I. SEAMAN. . . . . *Treasurer*
H. M. WILLIAMS. . . . *General Manager*

AIRCRAFT
JOURNAL
Formerly Air Service Journal

G. H. DICKINSON. . . . *Managing Editor*
ALEXANDER KLEMIN. *Aeronautic Editor*
LADISLAS D'ORCY. . . *Aerostatic Editor*
GEORGE NEWBOLD. . *Business Manager*

Air Service and Competitions

THE policy of the Air Service announced by Major General Menoher not to take part in competitions for prizes or trophies is in accord with the general policy of the War Department as well as the Navy Department regarding meets of all kinds.

It is obvious that the Air Service with airplanes built for speed could at the present time capture all the prizes offered for contests against time. Furthermore the use of Government equipment for this purpose would be improper.

The future of the sport of aviation will depend largely on the manner in which meets are conducted. The airplane is essentially a long distance vehicle and contests of this nature must of necessity cover large areas of the country. The terminus of such flights should be places where large crowds can be assembled and the finish be at a place where the winners can be seen. This combination will be very difficult until municipal landing fields near cities are established. Short flights and flying field acrobatics are of great military interest, but are not of a character to advance the cause of commercial aeronautics greatly.

The donation of trophies by several newspapers in various parts of the country for long distance flights is along the soundest lines. If with this were coupled requirements as to loads simulating commercial conditions and time schedules information would be secured which would be of great value in determining the industrial utilization of the air.

A New Conqueror of the Air

BY his no-stop flight from Chicago to New York, Capt. E. F. White has narrowed the distance across the Atlantic.

It was a perfect performance in every way, where others had tried and failed. As the first record of its kind it will stand for all time because of the distance and speed. But no one imagines that it will not be equalled and surpassed.

The world was startled when on May 29, 1910, Glenn Curtiss flew from Albany to New York, making two stops on the way. It takes no notice to-day of the fact that the mail is carried daily equal distances by air route. When Louis Blériot in 1909 made the first cross-Channel passage by aeroplane it was an event of first importance. How many thousands of times during the war has the air ferry made the trip from England to France and back? To-day Ministers on errands of state make the trip as a matter of simple convenience in keeping their appointments.

Capt. White made the flight from Chicago to New York between breakfast and dinner in six hours and fifty minutes, a trifle more than one-third of the time required by the fastest express train. Some day an aviator, with luck and skill in his favor, will fly from coast to coast of the Atlantic in one-fifth of the time required by the fastest liner ever built. It no longer seems merely possible. It is probable.—*New York World.*

No Parachutes for Airmen

BY an amazing decision attributed to the Treasury the further equipping of R. A. F. aeroplanes with parachutes has been stopped. This is economy gone hopelessly mad. The battle-efficacy of the parachute was dramatically demonstrated last year when two Boche airmen alighted in safety by this means from a giant aeroplane that was shot down in flames near Cambrai. We had a few aeroplanes equipped when hostilities ceased. If we had been more alert many valuable lives might have been saved.

It seems incredible that for the sake of a Treasury saving our airmen should be cut off from the chance of escaping from a disabled machine in mid-air. There are many unavoidable risks they must take. Why add one that is avoidable? If ships are required to carry boats and life-belts for saving life at sea, why should aeroplanes be destitute of life-saving appliances in an element less explored and quite as dangerous? For the present we prefer to believe in the existence of a misunderstanding. Whatever the explanation, Treasury parsimony must not be indulged at the expense of our airmen's lives.

The above editorial from the Paris edition of the *Daily Mail* of London indicates that the Royal Air Force is not having as full a development as has been indicated. The parachute problem in this country seems to be as backward, but it is not through lack of money or desire on the part of the Air Service, but the development of a suitable device.

Aviation Insurance

THE news that aviation insurance is to receive the attention it deserves from American companies is an important development. In England twenty-eight leading insurance companies offer this kind of insurance covering personal risk, damage to machines from any cause, loss of or damage to goods carried and injury to the public or public property.

That this field has been neglected by American companies is probably due to lack of facts for actuarial computations. At present, however, there is a mass of such figures available, and, on these, accurate percentages can be arrived at. Statistical data shows that planes at our training fields were in the air 2,319.57 hours per fatality, which at 80 miles per hour makes 185,000 miles. This will probably be regarded as safe travelling by the average reader, especially when it is taken into account that the conditions surrounding these flights were as unfavorable as would ever occur in peace times. Under the pressure of the need for specialized training, students were put through the courses with the greatest speed.

Seven times around the equator for each fatality is a fact that will make those who have regarded flying as unsafe think seriously as to the facts on which they have based their opinions.

Ceilings and Factors of Safety

CURIOUS things happen occasionally in aeronautic circles and often they furnish a laugh. Recently a government trained aeronautical engineer was asked by a member of a prominent airplane company if he knew the ceiling of the JN-4H. Hesitating for a minute the engineer replied: "Oh, yes. It is linen doped and varnished."

In commerce lapses now and then may be overlooked, but the salesman of a low-priced machine, who not long ago told a well-known flier that the "factor of safety" of the machine he was selling was "30 miles per hour" really needs admonition from his employers.

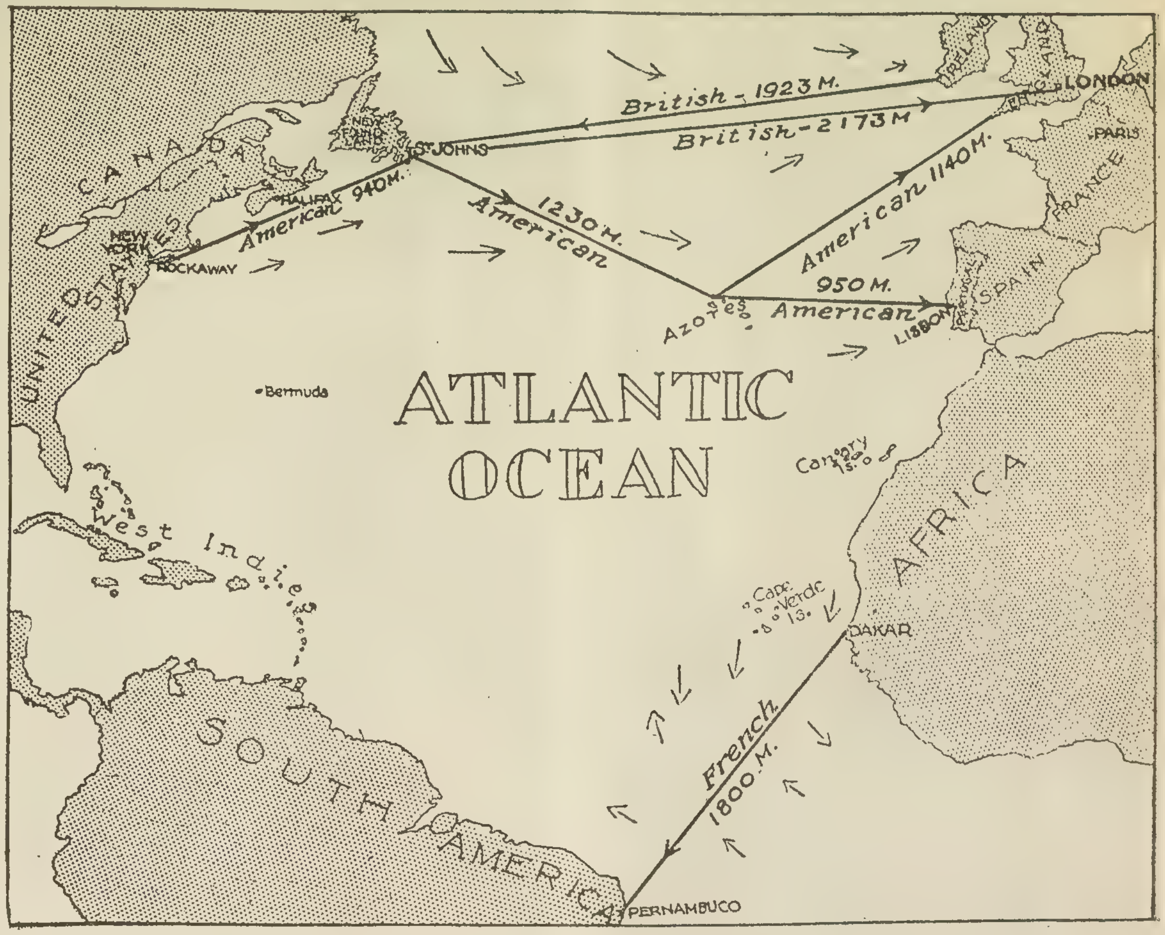
However, while we may not have many salesmen who ought to be aeronautic engineers, we assuredly have one aeronautic engineer who ought to be a salesman.

Sermons from a Balloon

THE novel uses to which aircraft of all kinds can be put is illustrated by an inquiry from an evangelist for a balloon from which he could conduct religious services. He evidently desires to have his organist and soloist accompany him, for he asks for a type which could be anchored in the air fifty feet from the ground and accommodate four to six persons.

"Nancy 1" May Be One of the Navy's Ocean Flying Boats

Another Engine Added and Some New Wings Being Made—British Fliers at St. Johns, Still Encountering Adverse Winds



TRANSATLANTIC ROUTES

The Route Selected by the United States Navy for the Transatlantic Flight is from Broyle Harbor, N. F., to Horta, Azores, and Thence to Lisbon

The NC-2 probably by a strange chance will be the only one of the great Navy flying boats at the Rockaway Flying Station which will not start in the proposed flight across the Atlantic. The time of the flight is still uncertain, but it will be undertaken not long after May 1.

Of the four big ships, each driven by four 400-hp. Liberty engines, two, the NC-3 and NC-4, never yet have taken to either of their two elements, air or water, but the NC-3 is practically completed. The NC-4 is still unfinished, but mechanics are very busy getting her into shape.

NC-1 Has Another Engine

While the NC-2 has been soaring over Long Island these last few weeks, attracting much attention to herself and arousing much enthusiasm over her chances of winning the great transatlantic gap in one hop, the NC-1 has been resting in the darkest and most obscure corner of the NC hangar. It was believed generally that this ship, the airplane which established the reputation of the type by making a flight with fifty-one men aboard, had seen its best days and was destined for the naval junk pile.

However, it now appears that Commander H. C. Richardson and the other pilots who will embark on the venture believe that she is better for the transatlantic flight than her newer sister, the NC-2. In her obscurity she has been fitted with an additional engine, for originally she flew with only three. It may be that she will show herself the best of the quartet in the air.

New Ship Lifts 28,500 Pounds

In the recent test flights of the NC-2 the Navy officers found, it is said, that she could be improved, although she showed great ability in carrying weights, having risen from the water with a gross load of 28,500 pounds. Two defects were noticeable. The four motors are arranged in two units, one of either side of the airplane. In each of these units there is one tractor, or pulling propeller, revolving in front of the wings, and one pusher, directly behind the wings. Thus the two pushers are really "starved" of air, because they are directly in the air current of the forward motor. Under these conditions it is believed that the 1,600 hp. of her four engines is not utilized to the best advantage.

The other defect is the fact that the two pilots, the navigator and possibly a radio man, are perched above the hull of the ship in a little boatlike arrangement, or nacelle, swung between the wings. The resistance offered by this nacelle to the swift passage of the airplane is considerable, the speed is diminished and the amount of gasoline used increased. In addition, it is exceedingly difficult and also hazardous to climb down by a rude ladder from the nacelle into the hull of the boat. In the roomy hull the pilot not on duty is supposed to rest, protected from the cold and wind which the man on duty is facing. When he relieves the other, however, he must climb up the ladder into the nacelle with a wind of ninety or a hundred miles an hour trying its utmost to blow him off the plane.

Others Are More Powerful

In the other airplanes of the type there is no pilots' nacelle. All controls are operated from the forward part of the hull. The engines are arranged in three units. The one in the centre, above the hull and between the wings, consists of two Liberty engines, one operating a tractor propeller and the other a pusher. On either side of this, also between the wings, is a single tractor propeller. Thus the propellers are so arranged that they may exert the greatest power with the least possible air resistance offered by the engines driving them, and with the pilots and crew all snugly housed in the hull.

The superiority of the NC-1 to the NC-2 has been noted for some time by the naval officers directing the flight, but although the motors of the NC-1 have been put into good condition, nothing has been done toward repairing her wings, one of which was wrecked when the flying boat dragged her anchor during the great March storm and drifted into a pier. It seems likely, therefore, that a few days before the flight the wings of the NC-2 will be shifted to the NC-1. With the exception of the arrangement of engines, pilots' nacelle, and a few other miner details the two ships, and indeed all the seaplanes of the type, are alike. It therefore will be a comparatively easy matter to take down the wings of the NC-2 and replume the denuded hulk of the original NC boat. Various types of propellers are being tried out, and at the present time the pusher propellers of the NC-2 are of the four blade type, while the tractors are two-bladed.

Mechanics Getting Ready

Thirty-six mechanics and members of the beach crew of the NC division packed up their dunnage at the station April 21 to go to the Navy Yard, where, it is said, they will be divided into three parties, and will board two second class cruisers, the Baltimore and the Columbia, and a converted mine layer, the Aroostock. It is understood that one of the vessels will go to Broyle harbor, Newfoundland, midway between Cape Race and St. John's; another to Horta, capital of the island of Fayal, in the Azores, and the third to Lisbon, Portugal.

This is taken as indicating that the Navy intends to take the shorter of the two routes to Europe which it has been considering. From Newfoundland to Fayal is about 1230 miles, while from Newfoundland to Ireland the distance is in round numbers 1900 miles.

It is possible, however, that the sending of men to the Azores is merely on the chance that this route will be selected. Franklin D. Roosevelt, Assistant Secretary of the Navy, said recently in discussing the flight that the destination of the NC-boats after leaving Newfoundland would not be decided until after the flight to Newfoundland had been made.

British Delayed by Wind

At this writing continued reports of "head winds" in mid-ocean caused postponement of the start of the transatlantic flights of Capt. Frederick P. Raynham, British aviator, and Harry G. Hawker, his Australian rival, in their competition for the $50,000 prize offered by the London *Daily Mail.* Both airmen are making social engagements, and have given up their hourly watch for an opportunity to "hop off," anticipating no immediate favorable opportunity.

If unfavorable weather and winds continue, several new competitors may arrive with their machines and attempt to get away with Raynham and Hawker. An airdrome is being prepared at Harbor Grace for a Handley Page venture, and on April 21 there arrived at St. Johns, N. F., an agent of Boulton & Paul, of Norwich, England, who is selecting a site for an airdrome and arranging for petrol and auxiliary supplies for that firm's airplane, which, he announced, is scheduled to start from there in May or June.

Capt. Sydney Bennett, son of J. R. Bennett, Newfoundland Minister of Militia, is reported as enroute to make final arrangements for Boulton & Paul.

The machine to be used in this attempt is said to be a twin-engined biplane of special design, but nothing definite has been made public of the exact style of the plane or of the identity of her pilot. Bennett may be the man, it was said. He was a British flier with the French army and wears the British War Cross.

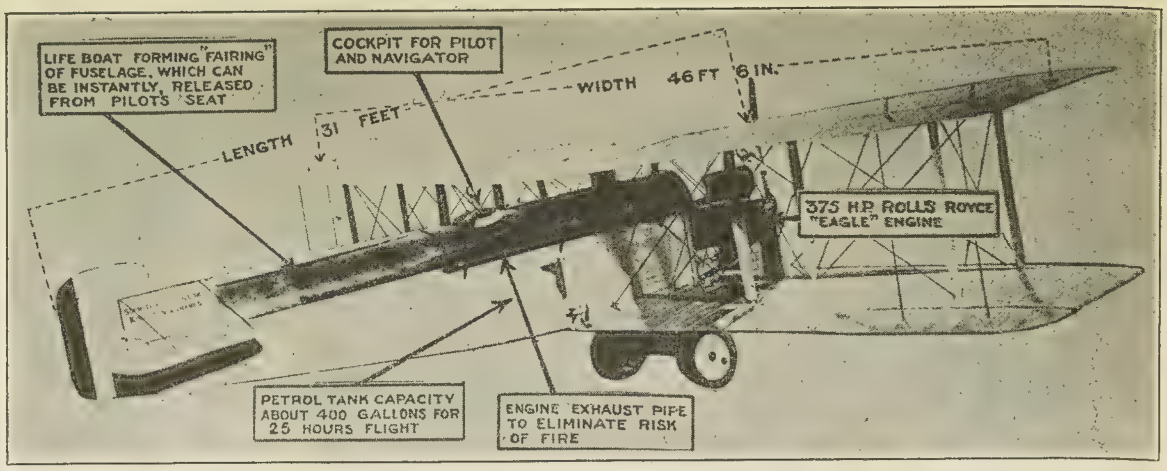
Studying Ocean Air Conditions

Lieut. Lawrence Clements on April 21 sent up a so-called propaganda balloon 12 ft. in circumference and similar to those used in the United States, except that it was dark brown instead of lemon-colored. Such a balloon was calculated to rise to a height of 10,000 ft., and by means of a distance glass and theodolite it would be possible to calculate from the path of the balloon both the direction and rate of the wind at that level.

This is the mean height at which Hawker and Raynham will probably fly. Unfortunately, the trial balloon became lost in the mist at 6000 ft., and so the experiment was a failure.

Kite balloon observations taken from the deck of the *Montcalm,* now on her way across the Atlantic for the purpose of studying mid-ocean air conditions, may also, if received in time, aid in these investigations. The southerly winds in mid-ocean are now replaced by east winds, which are prevailing over most of the course, and the local prediction is that the not unfavorable local south-west winds will soon change to east.

(Photo by Paul Thompson)
Harry G. Hawker


LIFE BOAT FORMING "FAIRING" OF FUSELAGE, WHICH CAN BE INSTANTLY RELEASED FROM PILOTS SEAT
COCKPIT FOR PILOT AND NAVIGATOR
WIDTH 46 FT 6 IN.
LENGTH 31 FEET
375 H.P. ROLLS ROYCE "EAGLE" ENGINE
PETROL TANK CAPACITY ABOUT 400 GALLONS FOR 25 HOURS FLIGHT
ENGINE EXHAUST PIPE TO ELIMINATE RISK OF FIRE

(Photo by Paul Thompson)
British Sopwith Two-Seater for the Atlantic Flight

Hawker's Views

Hawker, pilot of the Sopwith biplane, says that he disagrees with all implications that he and Grieve, the navigator, were taking their lives in their hands in the attempt to fly over the Atlantic. He asserted that the attempt was a straight-out piece of flying, and that every danger was now guarded against as far as possible. He denied that necessary safeguards had been disregarded, explaining that the sending of wireless had been removed because it could not be repaired here, and now that time had been gained on account of the bad weather, a new wireless was being substituted.

His new receiving apparatus will enable him to hear messages all the way across the Atlantic. His lifeboat is not equipped with oars, he added, because after sending up a signal light to denote position, it would be desirable rather to remain as nearly stationary as possible, and the boat, therefore, was equipped with a sea anchor. The signal lights carried burn two minutes.

Scientific Aims

Hawker regards the attempt to cross the Atlantic on the part of British aviators and manufacturers as a contribution to the scientific and practical development of aviation, and in no way as a "lucky chance" crossing. He says money does not enter into consideration on the part of either the fliers or navigators, denying that he and Grieve are to receive bonuses in addition to a share of the prize money.

It has been erroneously stated that Hawker is single and Grieve a married man. Hawker is married and is the father of a young child, while Grieve is single. It was Sopwith and not Hawker who flew in the Nassau Boulevard meet in New York.

Hawker said the object of the Sopwith expedition was to be the first to fly over the Atlantic, and not necessarily the first to start, and his attempt would not be made—regardless of when Martinsyde starts—till both the pilot and navigator should be satisfied that the proper time had arrived.

It is understood that Hawker is satisfied the dropping of the undercarriage will not lead to accident either on land or on the water, as the machine is fitted with skids for descending on land, and can come down even better on water without wheels.

Cause of Major Wood's Fall

Major J. C. P. Wood, who fell into the Irish Sea on the first leg of his transatlantic flight from Eastchurch, England, to Limerick, Ireland, says the only possible cause of engine failure that made his machine fall was an air lock in the petrol system. W. P. Kemp, manager of Short Brothers, who constructed the plane, agrees with him, saying:

"The engine itself was perfect. It is obvious that an air lock prevented the petrol from getting into the carburetor."

Nine Entries Now

Nine machines are now entered for the London *Daily Mail's* Atlantic flight prize. The latest entry was made last week, when J. A. Peters, representing the Alliance Aeroplane Company of Hammersmith and Acton, entered an Alliance biplane, with one 450 hp. Napier Lion engine. He named himself as pilot, and as navigator and assistant pilot Capt. W. R. Guthrie, R. A. F.

"I am the only designer who will make a flight in his own machine," Mr. Peters said. "I have been working on aircraft designs for about ten years and have flown only as designer and for experimental purposes."

Talked to Crowd by Radio

From an airplane 2600 ft. overhead, an Army officer in Washington, April 21, read President Wilson's Victory Loan message to a throng of 15,000 persons assembled at the south steps of the Treasury by the use of the wireless telephone and a newly invented sound amplifier.

Now open for enrollment of students

Essington Aviation School

Tuition given by instructors of long experience in civilian and army flying. Complete course $400.

The Essington Aviation School has the best facilities for water flying in the country, located just outside of Philadelphia, known as Chandler Field.

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AIRPLANES

Royal Flying Corps Canadian Training Planes, equipped with Curtiss 90 H. P. OX 5 engines. First-class flying condition. Immediate delivery. **$2,000.00** each. Complete supply service.

UNITED AIRCRAFT ENGINEERING CORPORATION
52 Vanderbilt Avenue, New York, N. Y.

World's Record Flight

General Seely, the chief British Representative on the Imperial Air Commission, who flew to Paris in record time states that a remarkable chance discovery has resulted in obtaining an increased speed for airplanes.

It was decided to cover in the passengers sent on a DH-4 airplane for the comfort and convenience of important personages travelling by air between London and Paris, and it was found that the cabin decreased the resistance offered to the air with the consequent increase of speed of about 10 miles an hour and adding about 60 horse-power to the engine capacity.

General Seely, Under Secretary for the Air, beat all flying records coming over from Folkestone to Paris a distance of 172 miles, in 74 minutes. The general took only ten minutes to cross the Channel between Folkestone and Cape Grisnez, five minutes between Cape Grisnex and Boulogne and fifty-nine minutes between Boulogne and Paris. The first page illustration of this issue of AIRCRAFT JOURNAL shows this DH-4 in flight.

One Year of Air Mail

On May 15 the Postal Air Mail Service will have been in operation one year. The public will be invited by the Post Office Department to witness the flights on that day from New York and Washington.

The same six planes with which the service was inaugurated, equipped with the same engines, will be in these flights. Lieut. J. C. Edgerton who piloted the first air mail plane into Washington from New York, and who is now chief of flying operations of the Post Office Department, will take the mail from Washington to New York in the same airplane propelled by the same engine in which he flew to Washington with the mail just one year before.

When the air mail service was inaugurated it was predicted that the service would be the seven days' wonder, and it was declared that the maximum life of any of the planes would be 140 hours actual flying time.

The postal air mail service will close its first year's operation with the record of 200 flying hours in the life of several of its planes, 14,000 miles of flying per plane, and it transported by air a grand total of over 200,000 pounds of mail, or about 8,000,000 letters.

The fact that the six original planes with their engines have survived this year's service, flying through all sorts of weather, snow storms and wind gales, with sometimes forced landings, has demonstrated the feasibility of commercial air service, and that commercial flying is entirely a different proposition from flying in the military service.

Air and Forest Services

Major-Gen. Charles T. Menoher, Director of Air Service, has advised the Forest Service of the Department of Agriculture that the Air Service will cooperate with the Forest Service in order to carry out certain experimental work desired by that bureau on fire patrol.

Henry S. Graves, the Forester, has been advised that he should communicate with the commanding officers of Rockwell Field, San Diego; March Field, Riverside; and Army Balloon School near Los Angeles, California. The Director of Air Service has instructed the commanding officers of these Air Stations to cooperate with the Forester in order to carry out the experimental work which he desires done during the coming summer. It is possible later that further work may be carried out at Mather Field.

Conferences between Air Service officers and representatives of the Forest Service have been held for the purpose of determining further coöperation between these two bureaus in assisting in fire patrol of National Parks.

Air Service not to Compete

On April 14, 1919, General Menoher, Director of Air Service, announced that owing to demobilization, reorganization, the Victory Loan campaign and the consequently great amount of work under way with reduced personnel, the Air Service could not take part in the second Pan-American Aeronautical Exhibition to be held at Atlantic City, during the month of May, 1919.

It was also announced that Army fliers and planes could not compete for the Pulitzer or other trophies for the same reasons, and for the additional reason that it was considered an improper use of the time of fliers and of Government property to compete for purses and individual prizes.

The Air Service will give favorable consideration to any project of this sort which has for its object aerial performance without remuneration for development, charitable or cooperative purposes of an international, national, state or civic character, but must adopt as a War Department policy, disapproval of any project which involves competition of Air Service teams or individuals with private clubs or enterprises for money or other prizes or trophies.

Panama Fliers Safe

Lieutenants Otto and Parker and Mechanician Hornby, army fliers, unofficially reported missing, with the big plane H S-2, between Bluefields, Nicaragua, and Havana, Cuba, are safe in Nicaragua, having been prevented from starting for Havana by engine trouble.

Word came through the Army Air Service from Panama that Lieutenant Otto had reported from Bluefields Bluff that it probably would be necessary to have a new part made there for his engine before proceeding to Havana on the second lap of the flight.

"THE SHARK," FIGHTING BOMBER

L-W-F ENGINEERING COMPANY, Inc.

COLLEGE POINT, L. I.

Curtiss Will Buy Airplanes

The sale of airplanes, engines and spare parts by the War Department to the Curtiss Company has not as yet materialized, pending an inventory and appraisal of the material by Curtiss engineers and Army Air Service Officers. This appraisal is being made at the present time and as soon as completed, negotiations with the government will be resumed.

Government officials were given authority by the War Department to sell the material consisting of 4608 Curtiss OX-5 engines and 1616 JN-4 airplanes and the price set was $2,720,000.

The reason for the desire of the Curtiss company, as explained by W. W. Mountain, chairman of the executive committee, to purchase this material was to protect the market by the prevention of the dumping of such a large amount of Curtiss equipment at such a time, and also to prevent the government from selling equipment in need of repair to individuals unfit to operate airplanes with the consequent result that Curtiss products and the airplane industry in general would receive a serious setback.

The disagreement with the War Department arose over a clause which the Curtiss Company desired inserted in the document providing that the War Department for two years should not dispose of any other Curtiss engines or airplanes to any other purchasers. When the contract was presented for signature this clause was omitted and the Curtiss Company refused to sign causing the deal to fall through temporarily.

Negotiations were resumed later and it was agreed that the appraisal by the army and Curtiss engineers should be used as the basis for the price to be set. Included in the material is to be 1100 Standard J-1 airplanes equipped with Hall-Scott engines. The Curtiss company agreed to accept these airplanes minus the engines and it was announced that it was their intention to dismantle them and use the parts as spares.

Mr. Mountain further stated: "We will send these airplanes to our Buffalo and Garden City plants to be overhauled and later sold at a low price to individuals who are desirous of starting air routes, training schools and colleges. This work in our plants will enable us to keep our organizations working full time and allow us to continue the development of new types which we are contemplating."

The cause for the inventory or appraisal now being made is due to the adverse criticism which developed in several quarters as to the condition of the material. To counteract this impression the Curtiss company requested a complete list of all the equipment and its exact condition. When this is completed to the satisfaction of both the government and Curtiss, a new price will undoubtedly be set and the deal consummated.

Bronston to Reopen School

J. E. Bronston, executive manager and secretary of the Eagle Aviation School, formerly located at 110-114 West Forty-Second street, has just returned from the service and will again take charge of the school. He was the organizer of this institution and continued as its active manager until he enlisted in the U. S. Navy.

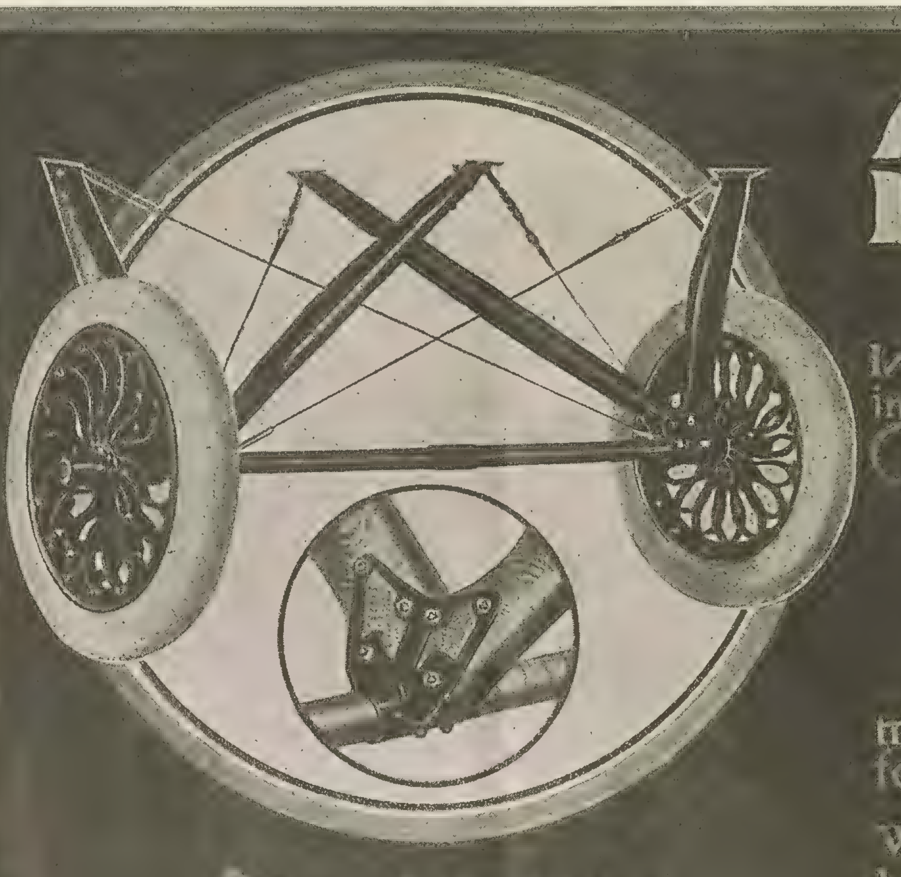
The Eagle Aviation School was temporarily discontinued last January because of the passing of the war need for aviation mechanics, its activities up to that time having the exclusive purpose of helping the nation to win the war. The school will now be reorganized by Mr. Bronston on a peace basis, for instruction in aviation and wireless telegraphy.

Mr. Bronston is enthusiastic over the future of aviation and sees a chance to build up a permanent educational institution.

Civilian Flying Licenses

These licenses have been issued by the joint Army and Navy Board of Aeronautic Cognizance:

License No.	Issued to	Address
334	C. J. Zimmerman	Keyport, N. J.
343	J. B. Porter	Wabash, Indiana
377	Leon D. Smith	Millerton, Pa.
380	Pomilio Bros. Corporation	New York City
381	Fort Worth Aerial T. Co.	Fort Worth, Tex.
382	Morse D. Levitt	New York City
383	William L. Lamkin	Porterville, Calif.
384	Northeastern Balloon Co.	Newburyport, Mass.
385	Lamont A. McDowell	Elizabeth, N. J.
386	Robert Bruce McGill	San Francisco, Calif.
387	Harold C. Brooks	Wabash, Ind.
388	V. P. Hollingsworth	Wabash, Indiana
389	Henry F. Fawcett	Wabash, Indiana
390	The Cameron Aerial Co.	Cameron, Missouri
391	Joseph M. Pallissard	Dayton, Ohio
392	The Curtiss Eastern Airpl. Corp.	Phila., Pa.
393	George H. Watkins	Cambridge, Mass.
394	Carl H. Duede	Stuart, Iowa
395	S. A. Purcell	San Francisco, Calif.
396	James Dazill McKee	Pittsburgh, Pa.
397	David R. Baker	New York City
398	Alexander Seversky	New York City
399	E. Clark Harter	Wenona, Ill.
400	Arthur W. Fox	Rockaway, N. J.
401	Everett K. Davey	Rockaway, N. J.
402	John H. Hughes	Macon, Georgia.



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Jules Vedrines Killed

Jules Vedrines, the noted French aviator, was killed April 21 when his machine (probably Morane-Sauliner) fell in the Department of Drôme while he was attempting to make a non-stop flight from Villacoublay, a suburb of Paris, to Rome. The mechanician also was killed.

The machine, which was built to bombard Berlin and weighed five and a half tons, was wrecked.

The accident occurred about 10.30 o'clock in the morning at Les Fouillouses, near the town of St. Rambert-d'Albon, on the Rhone River, south of Lyons, and it is believed it was due to the machine collapsing in the air. The aviators fell from a great height, and the death of both of them was instantaneous.

The mail sack which Vedrines was carrying to Rome was found among the débris of the machine.

Started for Rome

The aviator left Villacoublay at 6.30 a. m. in an attempt to make a non-stop flight to Rome over a route of about 700 miles. He started in clear weather and with a strong wind blowing from the north. The machine passed Sens at 6.50 o'clock and La Roche at 7 o'clock. Les Fouillouses, where his journey came to its abrupt termination, is about 225 miles from Paris.

Jules Vedrines was one of the world's best known aviators. His last exploit before his death was his accomplishment of the daring feat of landing successfully on the roof of a building with an airplane. He was the first airman to land in such a hazardous manner, and he won a prize of 25,000 francs by the feat.

Souther Field Commander

Lieut.-Col. Ira A. Rader, J. M. A., who has been stationed at Ellington Field, Houston, Tex., has been appointed commanding officer of Souther Field, including both the flying field and supply depot, and will report for duty at once. The appointment is dated April 14.

Major E. S. Schofield, has been in command as the ranking officer since the death of Colonel Dickman and Major Butts, and it is assumed he will remain in charge of the warehouse, under the command of Colonel Rader, he being better qualified for that position than any man in the service, having been in command of the warehouse until its recent consolidation with the flying field.

Store Airplane Delivery

For a long time, L. S. Plaut & Co., of Newark, N. J., has contemplated the use of airplanes for delivery purposes.

A committee was organized to look into every phase of the question. This committee called into consultation Julius M. Meirick, formerly of the Standard Aircraft Corporation. It was decided that airplane delivery should be conducted on strictly business lines and removed from the "circus" or "stunt" element. The mere carrying of merchandise by airplane obviously is not new. The Post Office carries mail bags daily to and from New York, Philadelphia and Washington. A Handley Page airplane recently carried nine men, each with an army locker from Elizabeth, N. J., to Texas, and the post office authorities when removing their field of operations from Belmont Park to Elizabeth, N. J., conveyed via airplane most of their paraphernalia including office equipment, etc.

Mayor C. E. F. Hettrick, of Asbury Park, offered an excellent landing field.

On Monday, April 28, the first regular department store airplane delivery system will start. This flight will be made from Newark, N. J., to Asbury Park, N. J., with a plane built by the Wittemann Lewis Airplane Corp., specially fitted and equipped for this service had piloted by Lieut. Stuart Alexander Morgan.

The first delivery will consist of approximately fifty separate orders to seashore residents.

To Air Service Aspirants

(By telegraph to Aircraft Journal)

Washington, D. C., April 21. All men who wish to take part in the development of the nation's air service as an aviator or dirigible balloon pilot, chauffeur, mechanic, or work at some thirty other trades required in the Air Service, by sending their name and address in care of the Department Air Service Officer, 104 Broad Street, New York, immediately, will receive an important communication on the subject which I have prepared after serving as an officer several months in the United States Army Flying School at Souther Field, Americus, Ga., and the United States Army Balloon School at Fort Omaha, Neb.

Charles J. Glidden, Captain, Air Service,
Military Aeronautics.

Ball Announced by 'Plane

Major Geoffrey H. Bonnell, United States Air Service, April 21 flew over New York City and dropped pamphlets from a low altitude over Fifth Avenue.

The flight was undertaken to announce the aviators' ball which will take place April 26 in the Ritz-Carlton Hotel.

The ball is to be held under auspices of the Air Service Memorial Fund. In his flight on April 21 Major Bonnell left Hazelhurt Field, circled the Statue of Liberty and then flew over the city.

$60,000 in Air Prizes Abroad

In order to encourage commercial and touring aviation, the *Echo de Paris* is offering $60,000 in prizes in a series of trials in which safety and comfort will be the chief considerations.

The course will consist of some 20 stages totaling 2,500 miles. It will cover the principal towns in France and stretch into all the neighboring countries except Germany.

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Member Manufacturers' Aircraft Association

Maintaining the Air Service In Peace Time

(*Continued from page* 4)

adopted: American designers, of whom there are some of excellent ability, are invited to design competitively some type which the Technical Section desires. For example, three designers are given orders for two-seater fighters. Each designer makes three sample planes, one of which is tested structurally, i.e., sand tested; the other two flight tested. From these three types the best is selected, considering strength and performance; and if it is enough better than the present two-seater fighter, the standard two-seater fighter drawings are replaced with production drawings of this new plane.

War-Time Production Anticipated

From the point of view of the third problem, that of rapid production in case of war, the Technical Division of the Air Service is engaged in the most careful preparations. It is working to get into its fireproof vaults, production tracings of every type of airplane that it is proposed to build in case of war. These tracings are the very latest word in airplane design. When war is declared these tracings will be run through blue printing machines and production drawings will be delivered to the factories in a very few days. With these drawings, suggested production tools such as jigs and dies are prepared, which will materially facilitate rapid production.

Simultaneously with the purely airplane work, the Technical Section continually studies instruments, improvements in armament and equipment.

These three main fields of activity persistently maintained will solve the problems of the peace-time Air Service.

Nine Atlantic City Prizes

So far nine trophies and prizes have been offered to be competed for during May at the Atlantic City meet. They are:

1—The Curtiss Marine Flying Trophy and $1000 cash prize.

2—The Pulitzer Trophy, to be awarded to the aviator who makes the best record in flying from anywhere to Atlantic City, and from Atlantic City to anywhere during the month of May.

3—The Boston *Globe* Trophy and $1750 cash prizes, to be awarded as follows: $1000 and the trophy to the aviator who makes the best record in flying from Atlantic City to Boston, or from Boston to Atlantic City, during the month of May; $500 and $250 to the aviators who make the second and third best records, respectively.

4—The Cleveland *Plain Dealer* Trophy and $1750 cash prizes, to be awarded as follows: $1000 and the trophy to the aviator who makes the best record flying from Atlantic City to Cleveland, or from Cleveland to Atlantic City, during the month of May; $500 and $250 to the aviators who make the best records, respectively.

5—Colonel William A. Bishop's "Ace of Aces Trophy," to be awarded to the aviator who makes the best record in flying from Toronto to Atlantic City, or from Atlantic City to Toronto, during the month of May.

6—$2000 Intercollegiate Seaplane Speed Trophy, to be awarded to the college whose representative makes the best record in flying twenty times over a five-kilometer course at Atlantic City during the month of May.

7—$2000 Intercollegiate Aeroplane Trophy, to be awarded to the college whose representative makes the best record in flying twenty times over a five-kilometer course at Atlantic City during the month of May.

8—The Intercollegiate Dirigible Trophy.

9—The Intercollegiate Balloon Trophy.

Besides the above there are the Valentine prizes.

Answers to Correspondents

All bona fide inquiries will be answered by letter to the inquirer and included in these columns. Questions should be accompanied by stamped addressed envelopes.

E. C. C.—If you contemplate enlisting in the Army Air Service we suggest that you write to Department Air Service Officer, 104 Broad Street, or Recruiting Officer, 461 Eighth Avenue, New York City.

M. G. H.—Capt. Edward V. Rickenbacker has been honorably discharged from the Air Service.

G. W. S.—Helium has a lifting power of about 65 lb. per 1,000 cu. ft. as against 68-70 lb. for hydrogen.

P. B. F.—What are the speed records of the day? On what aeroplanes have they been obtained?

The Loening Monoplane has given a speed at ground level of 145 m.p.h. The Curtiss Triplane has done 151 m.p.h. The single seater scout built by the Thomas-Morse Company with a 300 hp. Hispano engine is said to have attained a speed of over 160 m.p.h.

R. R. S.—There are two well-known systems of airplane control. One is called the Deperdussin control, commonly known as the Dep. control, and the other is the joy-stick control. In both systems a foot bar is used to move a rudder, and a column moves back and forth to work the elevator. In the Dep. control, a wheel is placed on the control stick and the ailerons are operated by the turning of this wheel. In the joy-stick control elevators and ailerons are operated by the stick.

Aeronautical Engineering and Airplane Design

By

LIEUTENANT ALEXANDER KLEMIN

Air Service, Aircraft Production, U. S. A., in Charge Aeronautical Research Department, Airplane Engineering Department. Until entering military service in the Department of Aeronautics, Massachusetts Institute of Technology, and Technical Editor of *Aviation and Aeronautical Engineering*. In two parts.

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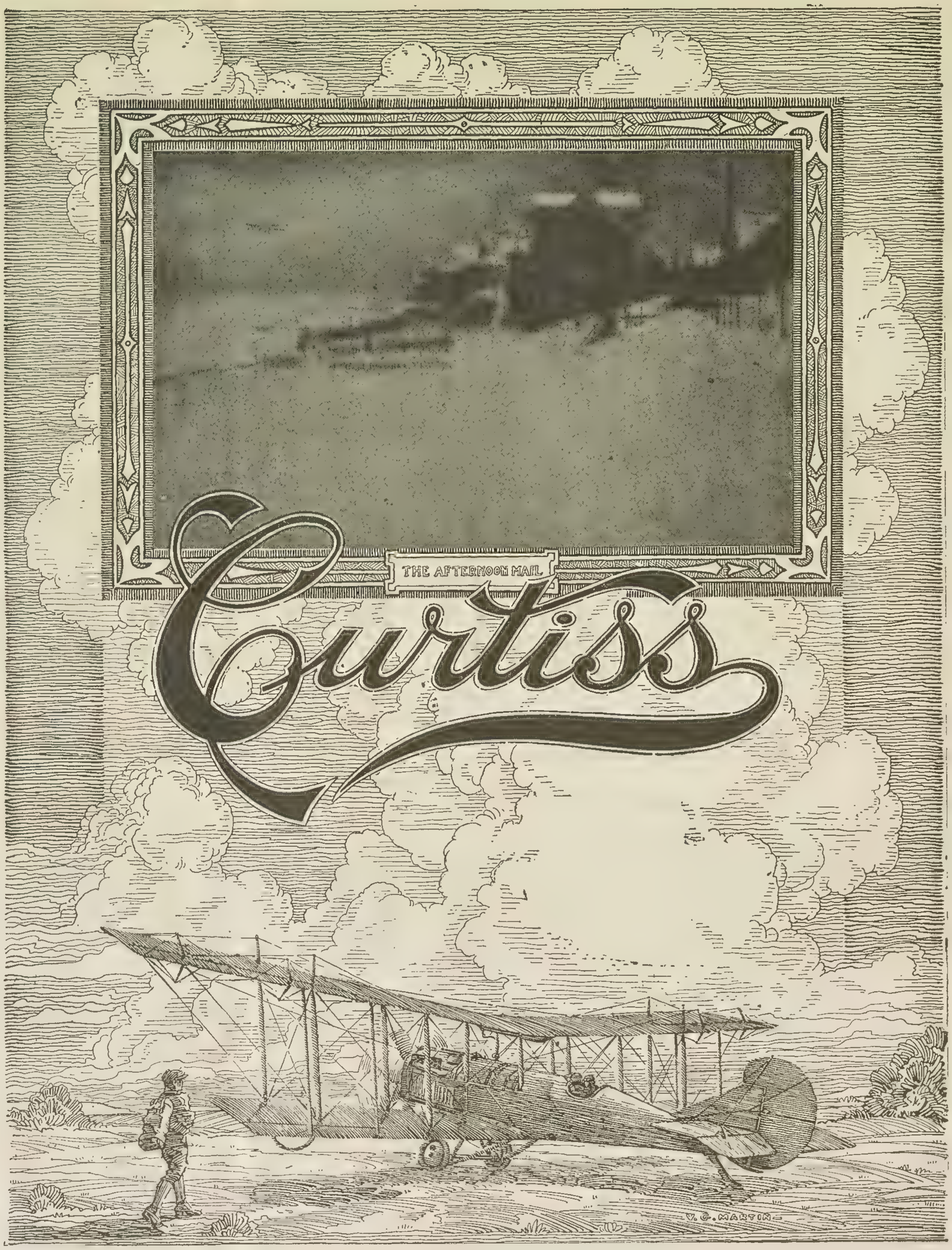

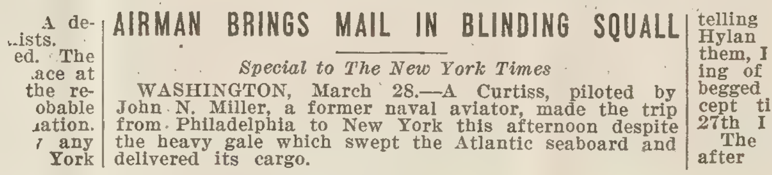

AIRMAN BRINGS MAIL IN BLINDING SQUALL

Special to The New York Times

WASHINGTON, March 28.—A Curtiss, piloted by John N. Miller, a former naval aviator, made the trip from Philadelphia to New York this afternoon despite the heavy gale which swept the Atlantic seaboard and delivered its cargo.

CURTISS AEROPLANE AND MOTOR CORPORATION, *Sales Office:* 52 VANDERBILT AVE., NEW YORK CITY

CURTISS ENGINEERING CORPORATION, Garden City, Long Island

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May 3, 1919 *Every Saturday* *Price Ten Cents*

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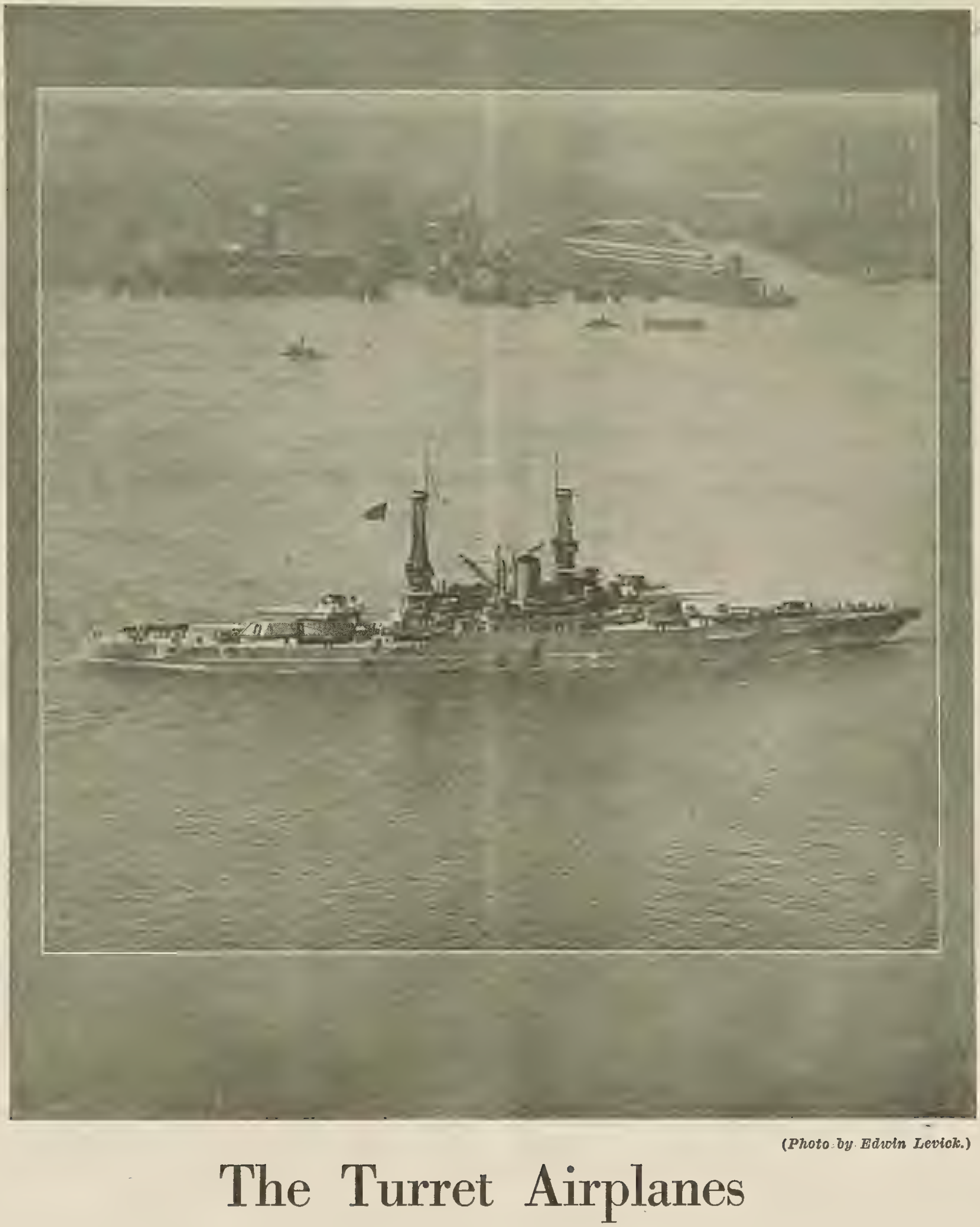
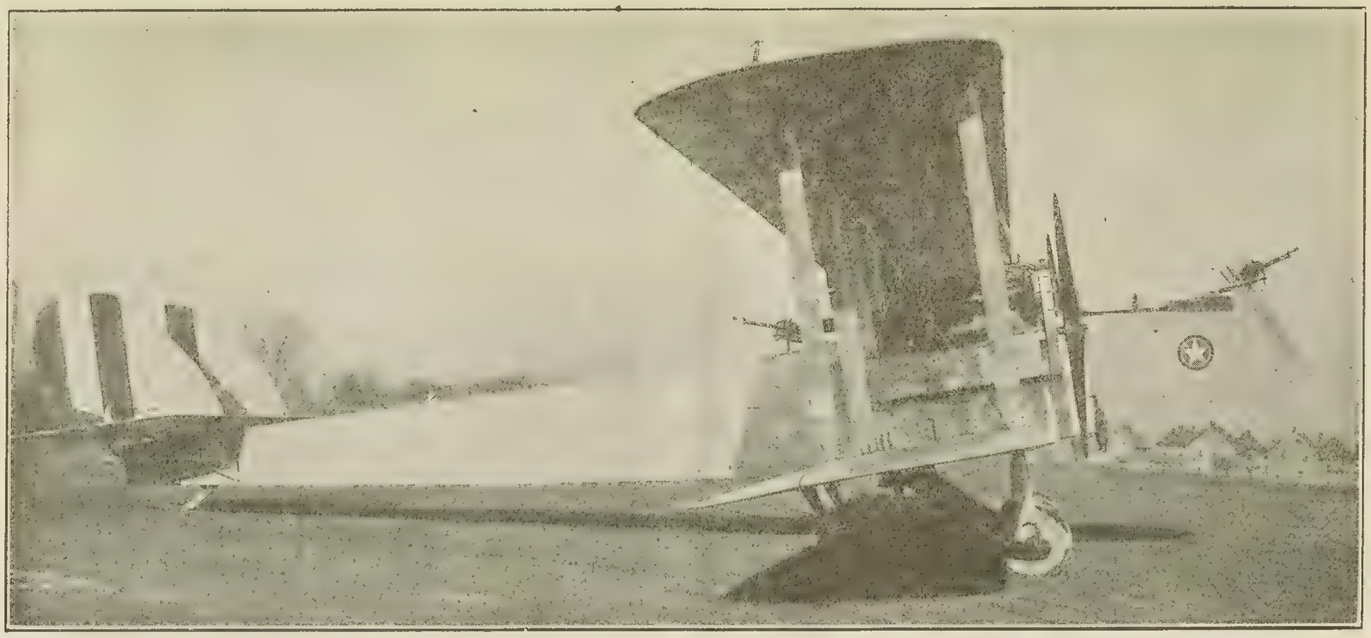


(*Photo by Edwin Levick.*)

The Turret Airplanes

U. S. S. Mississippi, with Two Airplanes—on Forward and Aft Turrets—Leading Admiral Mayo's Fleet into New York Harbor



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N-C's Due to Start Within 10 Days

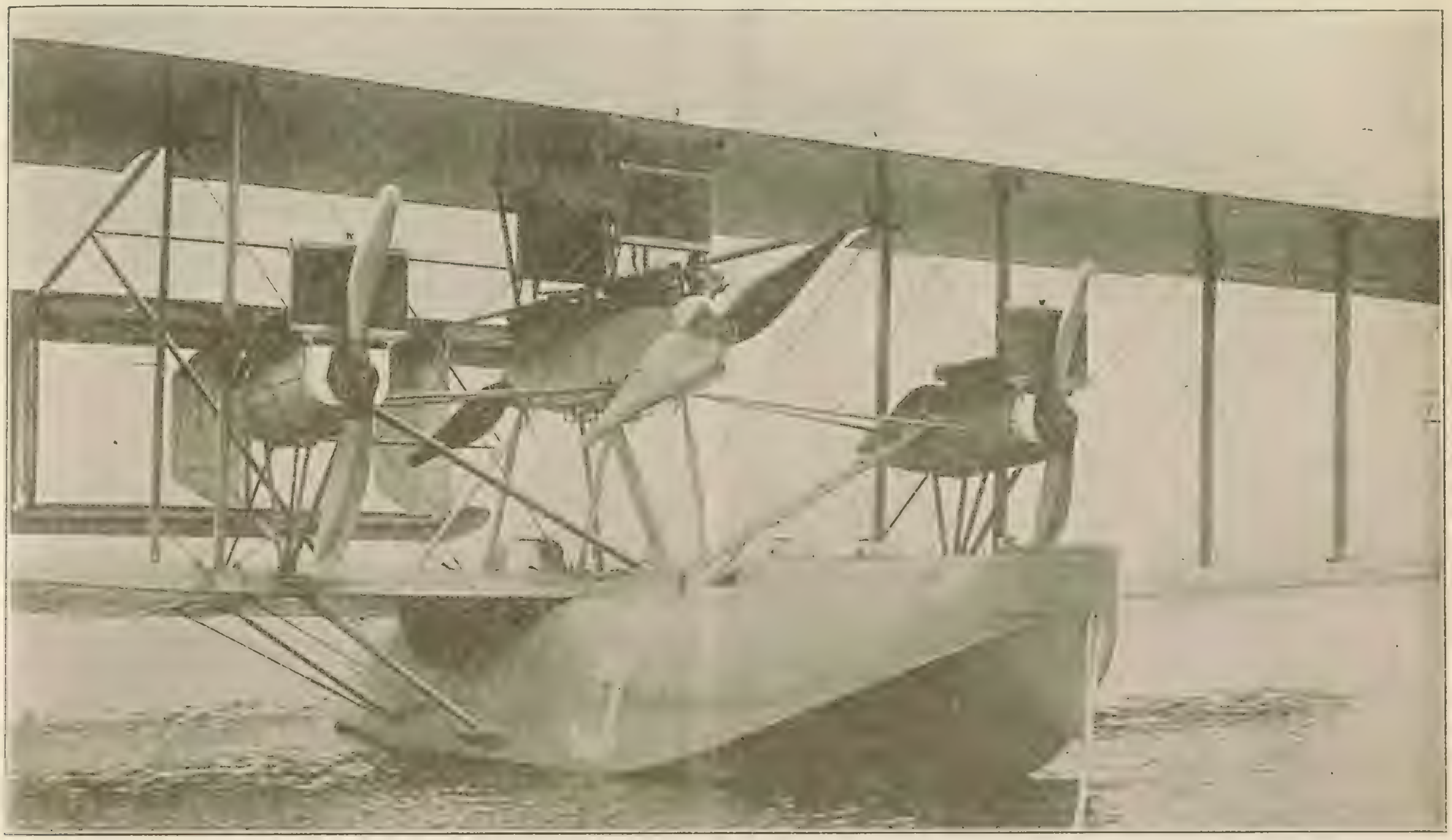
Personnel of the Crews Selected and Navy Flight Patrols are Already on Their Way

Smithsonian Institution
MAY 3 1919
Library

Commander John H. Towers, who has been in charge of the Navy's preparations to fly across the ocean, will lead the great effort as the commander and navigating officer of one of the three NC flying boats now almost ready to start.

This was announced officially April 28 at the Rockaway Air Station. Commander Towers has announced that the Azores route will be used, a fact printed by the AIRCRAFT JOURNAL of April 26.

"The flight by the three naval flying boats will go ahead notwithstanding the success or failure of any other attempts before the start," said Commander Towers. "The time schedule planned is liberal as far as Newfoundland, as the Navy does not regard the trip to that island as part of the trans-ocean flight. One stop will be made at Nova Scotia, as it is desired to save the engines as much wear as possible. The full load will not be carried from Rockaway to Newfoundland. Flying under a full load imposes an undue strain on the engines.



Close-up View of the NC-3 Now Ready for the Atlantic Flight. Two Types of Propellers are Shown. Those in the Center are Olmstead and the Others are Curtiss Types

"The amount of time spent at Newfoundland will depend upon whether the start from Rockaway is made on schedule. We may remain a week or more at Newfoundland. The time we take off on the actual flight has been fixed since Feb. 24, but I cannot announce it now. It was necessary to settle some day because of the fact that the destroyers and other vessels must be at their stations. The route to Newfoundland will be patrolled to a limited extent by destroyers."

The crews will be as follows:

CREW No. 1

Commanding officer	Commander J. H. Towers
Pilot	Commander H. C. Richardson
Pilot	Lieutenant D. H. McCullough
Radio operator	Lieutenant Commander R. A. Lavender
Engineer	Machinist L. R. Moore
Reserve pilot	Lieutenant B. Rhodes

CREW No. 2

Commanding officer	Lieutenant Commander A. C. Read
Pilot	Lieutenant F. F. Stone
Pilot	Lieutenant W. Hinton
Radio operator	Ensign H. C. Rodd
Engineer	Chief Special Mechanic E. H. Howard
Reserve pilot engineer	Lieutenant J. L. Breese

CREW No. 3

Commanding officer	Lieut. Com. P. N. L. Bellinger
Pilot	Lieutenant Commander M. A. Mitscher
Pilot	Lieutenant Y. T. Barin
Radio operator	Lieutenant H. Sadenwater
Engineer	Chief Machinist Mate C. I. Kesler

Four Are Naval Reserve Men

Four of those selected are Naval Reserve men, one, Lieutenant Stone, a coast guard officer, and the ten others regular Navy men. In addition these three men, officially known as reserve pilot engineers, men capable of acting either as pilots or engineers, will fly as far as Newfoundland: Lieut. (j. g.) Braxton Rhodes, Lieut. J. L. Breese and Machinist Rasmus Christensen.

NC-3 Does Well in Test

Commander Towers said that tests of the NC-3 have demonstrated her ability to fly under the full load. These tests will be repeated on the NC-4, and on the NC-1, which established the reputation of the NC boats, but which is now being refitted with four engines. The NC-1 will be ready the last of this week or the first of next. The start from Rockaway will probably be made some time during the latter part of next week.

The British Government has furnished, and will continue to furnish, meteorological information concerning conditions in and around Newfoundland. The harbor in Newfoundland, whose location has not yet been announced, was also obtained after negotiations with the Government. No base will be established on shore, as this would be too costly. Instead, the seaplanes will be moored in sheltered waters with a supply ship standing by alongside to furnish gasoline, oil and other supplies. Broyle Harbor and Placentia Bay have been mentioned as probable rendezvous.

The NC planes have a wing spread of 126 ft., a height of 24½ ft., a length of 68 ft. and a gap between the wings varying from 12 to 13½ ft. The maximum speed—a speed which cannot be reached under full load—is ninety-five miles an hour, and the landing speed about fifty miles an hour.

Sixteen enlisted men, including four chief petty officers, carried their dunnage off the station April 28. They will go to Plymouth, England. This would seem to indicate that the flight of the NC ships may end in England instead of Portugal, as previously decided. The route would thus be Newfoundland to the Azores to Portugal to England.

Southeastern Aeronautical Congress at Macon

Participation by the Army Air Service and Addresses by Generals Menoher and Mitchell

The Army Air Service will participate in the Southeastern Aeronautical Congress, which is to be held in Macon, Ga., May 2 to 10, it is announced.

Major General Charles T. Menoher, Director of the Air Service, and Brig. General William Mitchell, Chief of Operations, will speak. General Menoher will attend the conference on Monday, May 5 and on that day also, it is declared, Brigadier General L. E. O. Charlton, British air attache, will be the guest of the Congress.

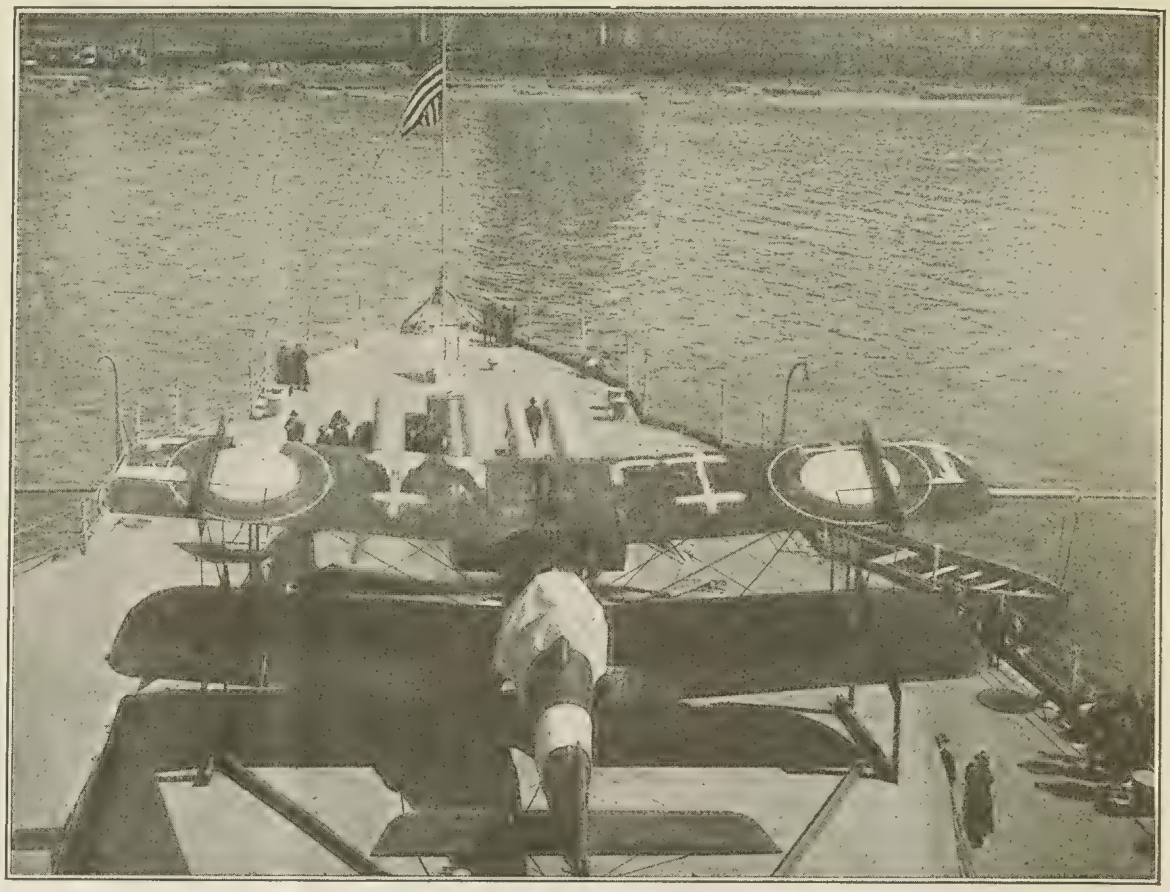
According to information obtained by the Air Service, the Macon congress is the result of a widespread movement among municipalities looking toward the establishment of landing fields suitable for use as military or postal terminals while being developed, of course, as commercial centers.

The idea was first broached to the Director some weeks ago. The Macon Chamber of Commerce queried 300 commercial organizations in the states south of the Ohio river and east of the Mississippi and to date 243 of these have signified their intention to send delegations of from five to twenty-five persons. In addition, delegates are to be sent by some two score cities. Four Governors of states and a number of Senators and Representatives, according to information supplied by the congress, are to participate in the meeting.

The Director of the Air Service has had in preparation specifications for standardized landing fields and these data are to be made public at the time of the Macon congress. The military authorities, cooperating with the Post Office Department, are desirous of providing the proper information to all municipalities desirous of establishing landing fields.

The Air Service, on the invitation of Otto Praeger, second assistant postmaster general, is investigating the feasibility of establishing an experimental air mail route from Macon to Montgomery, Ala., a distance of 150 miles. Mr. Praeger, it is also declared, will attend the Macon congress and will address the delegates on the development of the aerial mail.

The Air Service is arranging an extensive exhibit of airplanes, parts, motors, photographs, etc. Major Junius Houghton, now in command of Carlstrom Field, has been ordered to Macon, where he will have charge of the army's flying demonstrations, which will consist of squadron exhibitions, voice control, gunnery, etc.



(Photo by Edwin Levick.)

Airplane on the Aft Turret of the Mississippi

Begins Airplane Insurance

Aircraft insurance, long foreseen, but up to the present time, not undertaken on a serious scale by any American company, became a reality April 24, when the Travelers Insurance Company announced that it would insure owners, operators and passengers against many of the risks of aerial travel.

The Travelers regards airplaining as something more than a sport, as its program is based on the assumption that the use of airplanes for business and civilian purposes will increase vastly in the next few years.

The company is prepared to issue life and accident insurance on persons using airplanes. It will also insure the compensation risk for companies making or operating airplanes, as well as the liability and property damage risks of the owners and operators.

The Travelers is the first company to take this step just as it was the first to write personal accident tickets in America, and the first to write a liability policy for automobilists.

"The lines of insurance announced by the company for the present will be life insurance (one year term contract), accident insurance, for owners, passengers and pilots; workmen's compensation insurance for employees who are required to fly, including pilots and mechanicians, as well as any other employees whose duties take them into the air. The insurance plan up to this point deals with the individual.

"The remaining lines of insurance will include public liability for injuries occasioned by aeroplanes while landing or taking off or because of articles which might be dropped from aeroplanes to the ground, but not including injuries to passengers or others carried in the aeroplane. Accompanying this latter form of insurance will be property damage insurance, written by the Travelers Indemnity Company, which covers the liability of the aeroplane owner for injury to the property of others not carried on the machine itself.

"The Travelers companies will not write these two last mentioned lines separately. If one is taken both must be taken. It must be borne in mind that the public liability obligation is very substantial. Under the law as it exists today a person who flies over private property is guilty of technical trespass and if an aviator is compelled to land or chooses to land upon private property trespass becomes actual, and as to the resulting damage to buildings, trees, stock, crops, and other things on the property there is practically no defense. It is not a question of negligence but a question of trespass. The injury to individuals is in much the same situation. If the injured person is the owner of property upon which the machine landed, or over which it flew, or is a member of the owner's family, or an employee rightfully on the premises, the question is one of trespass and not negligence, while the rights of bystanders and strangers would be judged by the law of negligence, with a sentiment very strongly in favor of the injured.

"It is the purpose of the company to undertake these lines upon a basis which will be purely helpful, and which will encourage the growing use of airplanes for all proper purposes. Business will be written under careful inspection supervision, and data will be carefully accumulated with reference to types, equipment, uses and many other elements.

"The Travelers companies are prepared to announce rates and submit forms of contract to all legitimate inquirers who have definite propositions to offer. Compensation rates will be quoted tentatively, subject to approval by the proper state authority, which is made necessary by the existing law. Otherwise the Travelers companies are immediately prepared to handle such of this business as is definitely offered in good faith."

AIRCRAFT JOURNAL

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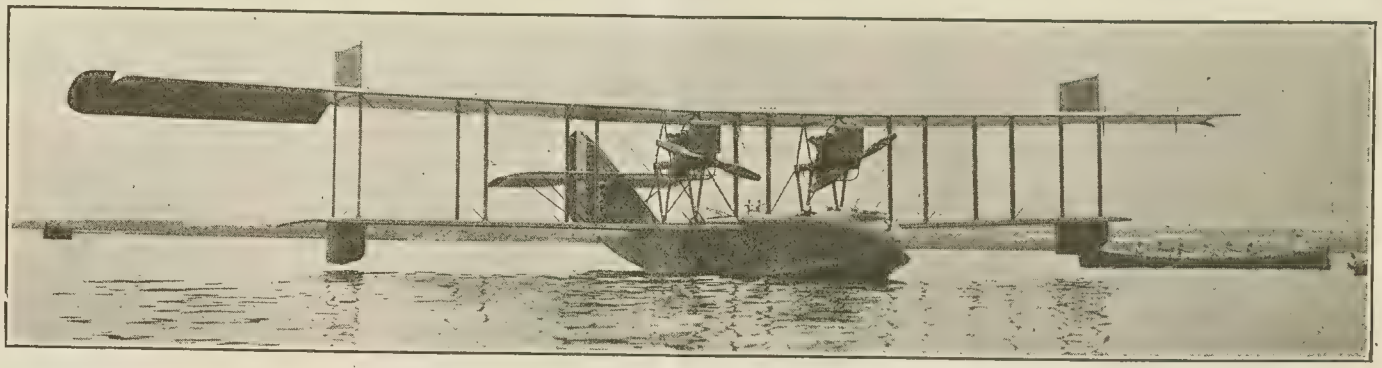
F-5-L In Flight More Than Twenty Hours

Marvelous Performance of the Navy Coastal Patrol Seaplane at the Hampton Roads Operating Base

Remaining in the air for a little over twenty hours in continuous flight, and maintaining a speed of about sixty miles an hour, the naval seaplane F-5-L, Serial No. 3589, landed Saturday morning, April 26, at 7:52, on the aviation field at the Hampton Roads naval operating base.

Only an insufficient supply of gasoline, due to the inadequacy of the tanks on the machine, forced a landing, and at a time when the engine was running smoothly, and in the opinion of the operators was still capable of hours of perfect flight.

In the flight the plane covered a distance of 1,250 miles.



(Photo U. S. Naval Air Service.)

Navy F-5-L Coastal Patrol Seaplane Fitted with Two Liberty 12 Engines

Hundreds of officers from all sections of the Fifth Naval District, who had been watching the flight for hours as well as thousands of enlisted men, crowded the field to watch the landing and cheer the aviators when they came down. The crew of five men were lustily cheered as they sprang from the machine and came across the lawn to report to the station commander and so submit the record of flight, with the registering instruments.

Lieutenant Commander Grow, U. S. N., was in the pilot's seat of the F-5-L during the long flight. Ensigns Thomas, Souther and Irvine, all of the Base, were aboard the machine, in the capacities of observers and navigators. Several times during the long flight Commander Grow was relieved at the wheel by Ensign Thomas.

The machine took to the air April 25 at 11:42 a. m. with the expressed intention of breaking all endurance records and of demonstrating conclusively that it was possible to make a continued flight across the Atlantic Ocean. Throughout the entire afternoon and often bucking a strong breeze over the Chesapeake Bay and the Virginia Capes, the F-5-L described a great circle, extending northward to the mouth of the Potomac River and then eastward to the Atlantic Ocean, sweeping over the Capes and then inland to the naval station.

Plane Behaved Perfectly

Commander Grow, in talking of the long flight, declared that no plane ever behaved more perfectly. He said that at no time was there any indication of halting on the part of the engine or any other trouble calculated to force a landing. All night long the plane continued its flight, guided by the lights at the mouth of the Potomac, lighthouses at the Capes and a special light provided at the station. The speed of the plane was cut down owing to the nominal elevation at which the flight was made, approximately 3,000 feet. The resistance of the air was greater and the wind continously unfavorable.

"The only thing that caused us to land was a lack of fuel," said Commander Grow. He said that it would have been possible to have remained aloft for hours until the men handling the machine had become exhausted but for the fact that the fuel tank was insufficient in size for a longer flight. There was not enough gas remaining in the tanks for another circuit of the route selected when the big plane glided to the earth.

A Coast Patrol Machine

Officers of the flying field said that there was no intention on the part of the operators to attempt a transatlantic flight with the machine, which they admit, is not properly equipped for such an undertaking, but they asserted that the success of the flight demonstrated the absolute feasibility of flying across the Atlantic with one of the larger type of new seaplanes, with its great gas tanks and more powerful engines. They even believe that the F-5-L, with a supplemental gas tank and with more favorable weather conditions, could accomplish the feat.

The F-5-L is of the twin engine type of planes used almost exclusively by the navy in coast patrol work. It is equipped with two Liberty engines of 400 hp. each. It is recognized as one of the most powerful models of the early war type, but was not equipped with tanks for more than a twelve or fifteen hours' flight. It is equipped with wireless and all other modern devices. It is declared by the officers to be one of the world's most reliable seaplanes.

Elation is marked at the base and yard over the performance of the F-5-L, which is called little short of marvelous.

Captain Noble E. Irwin, Director of Naval Aviation, said in Washington, April 27, that the record made by Commander Grow's plane had only once been exceeded by a heavier-than-air machine, a German airplane having remained in the air for a longer period before the Great War began. The previous record for a naval seaplane was about ten hours, it was said.

In airplanes there have been longer duration flights. On June 26-27, 1914, Adolph Landmann in an Albatros biplane equipped with a 100-hp. Mercedes engine remained in the air continuously 21 hours 48 minutes and 45 seconds and this record was allowed by the International Aeronautic Federation.

On July 11, 1914, Reinhold Boehm remained in the air 24 hours and 12 minutes in an Albatros biplane at Johannisthal. The record, however, has never been officially passed.

But carrying a crew of four the record made by Commander Grow stands by itself.

Balloons in High Flights

Two United States Army balloons started from Omaha April 17, at midnight, on an experimental flight in high altitudes, to test meteorological instruments. Lieut.-Col. W. S. Wuest, commanding officer at Fort Omaha, and Lieut. Ralph A. Reynolds accompanied the balloon, which was consigned to an altitude of 5000 ft.

Capt. F. W. Goodale and Lieut. C. L. Leroy Meisinger were in the craft selected to register 10,000 ft. After being aloft for from forty-eight to seventy-two hours at the selected levels, the airships reported safe landings, one at Cabot, Ark., and the other at Orola, Miss.

Air Service Observers

The following-named officers, having completed the required course, are hereby rated as Observers: First Lieut. Sidney P. Le Boutillier, A. S. A.; First Lieut. James P. Carberry, A. S. A.; Second Lieut. Glennen K. Vars, A. S. A.; Second Lieut. Benedict Fox, A. S. A., and Second Lieut. Jerry L. Bennett, A. S. A.

(Photo International Film Service.)

S.S. Navannah, Built by Great Britain Solely for Use as a Mother Ship to Naval Seaplanes

Notes on Technical Aeronautics

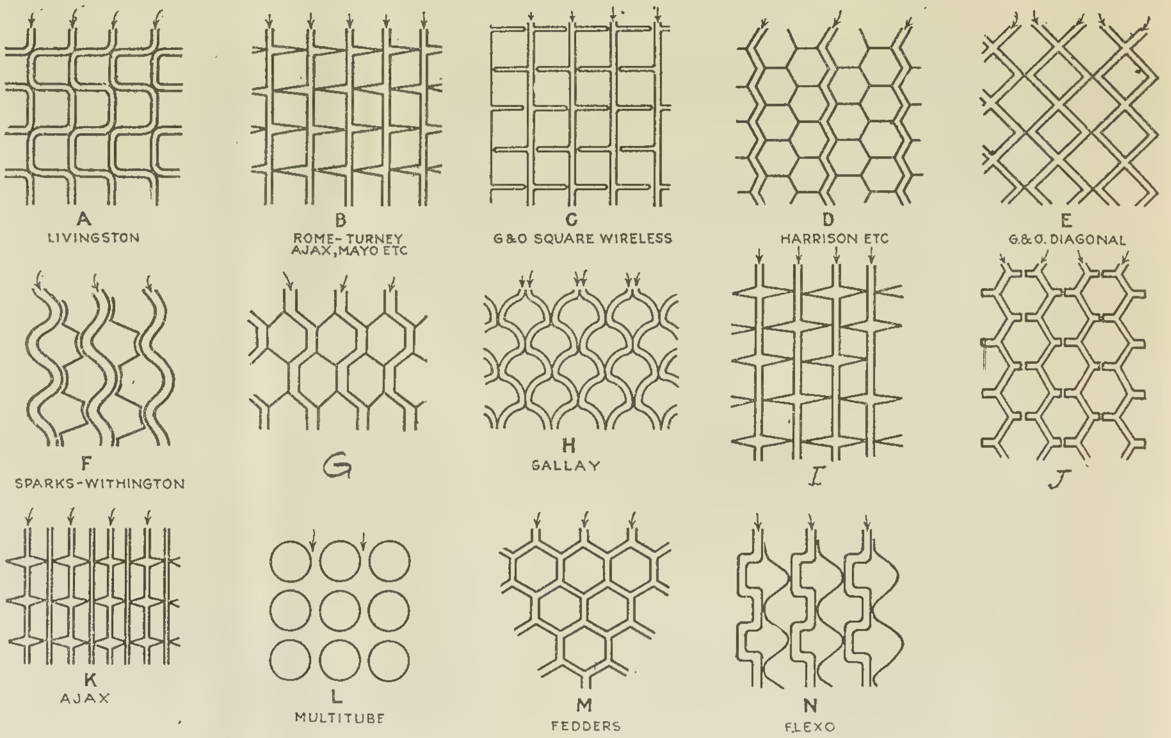


Fig. 2—Types of Honeycomb Radiator. These Are Drawn Slightly Out of Scale to Show the Water Passages Clearly

Aircraft Radiators

One of the most difficult problems in airplane design is the radiator. It is still in such an experimental condition and quantitative data is still so uncertain that every contribution to the literature of the subject is welcome. A recent paper at the S. A. E. furnishes an interesting review of the present status of the problem and furnishes a collection of much valuable data.

In general, six types of mountings for aircraft radiators are used:

Type 1.—The installation of the radiator in front of the engine and on the nose of the airplane fuselage is one of the commonest of present methods of disposing of this question. The radiator is of the honeycomb type and part of the radiator is cut away to permit the crankcase extension to project through. The Curtiss JN-4, and R-4, the L. W. F. model V and other well-known machines exemplify this.

Type 2.—In pusher-type flying boats the radiator is of necessity placed in front of the engine. The Curtiss model HS-2-L is an example of this.

Type 3.—An installation much used on German airplanes is the mounting of the radiator on or just below the nose of the upper wing. The Sturtevant and the L. W. F. model G-2 radiators are examples of American applications.

Type 4.—Another installation popular in this country at one time, but discarded of late, calls for the placing of a tall, narrow, honeycomb radiator above the engine and extending to and often above the upper wing. The Wright-Martin model R and the standard model J are good examples of this.

Type 5.—Another type places the radiator on each side of the fuselage.

Type 6.—The latest development in radiator installation, introduced in the last two years by the German Albatros designers, consists of setting the radiator in the upper wing, and in some cases making it conform to the wing curve. This installation has also been used on the Lepere. It sometimes introduces structural difficulties through interference with the internal wing wiring, but these difficulties are by no means insurmountable.

The honeycomb type of radiation is at present the most used largely on account of its adaptability and owing to the fact that it is well suited to large production at moderate cost. As shown in Fig. 2, it is made in a considerable number of forms by many American manufacturers (the Gallay alone being of British manufacture). The multi-tubular types are made by soldering small tubes together, and offer many manufacturing advantages.

The tubular type of radiator consists of water tubes with radiating fins, is quite distinct from the honeycomb type, and has been largely confined to installations where the radiator is mounted on the side of the body.

The honeycomb and tubular types of radiators can, of course, be used in any of the five positions of the six types given above. But for the radiator placed in the wing a special construction has to be employed. Thus the Albatros wing radiator shown in Fig. 1 consisted of 650 flattened copper tubes running laterally across an opening in the wing, with flat sides set at an angle of about 40 deg. Water entering the upper part of the right-hand water pocket flowed through the upper tubes to the left-hand water pocket and returned through the lower tubes to the lower part of the right-hand pocket. The top and bottom of water pockets were designed to set flush with the wing surfaces, and the radiator was supported by cast brackets, riveted to the water pockets which rested on the wing beams. An expansion tank was provided at the front.

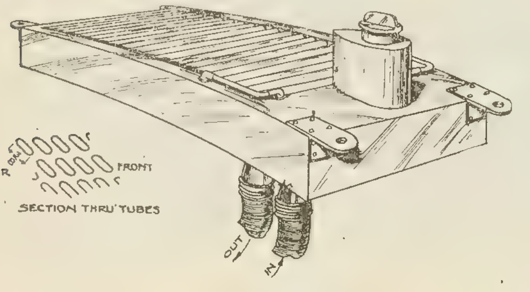


Fig. 1—Wing-Curve Type of Radiator Used on the Albatros Machine

An Early Standard Machine Showing the Side Radiators

Another example of the wing radiator is that on the Lepere machine, shown in Fig. 3. This radiator consists of hollow flat plates through which the water circulates, while the air passes between them. The plates are parallel, set on edge, and about 9/32 in. center to center. The plates are connected to distributing and collecting headers and are built up out of two flat and parallel sheets of copper separated by a central corrugated copper sheet. The process of manufacture which is very ingenious, is as follows: The two flat and the center corrugated plates are clamped together with sheets of solder-foil between the copper sheets. The temperature is then raised to above the melting point of the solder and the foil fuses, fastening the three plates together the completed plates are then assembled with the collecting and distributing pockets.

The central corrugated sheet makes the plates sufficiently rigid to eliminate the necessity for external bracing.

It does not seem possible at the present moment to say definitely which is the best location of radiator. For each particular design a study of two or three types has to be made in the design room and, if possible, by testing in the air. (*A. Black, S. A. E., March 7, 1919.*)

After Engine History

Second Lieut. Walter L. Perley, Air Service Production, will proceed from Washington, D. C., to Chicago, Ill., thence to Toledo, Ohio; thence to Swissdale, Pennsylvania; thence to New York City, New York, on temporary duty in connection with the Air Service of the Army, for the purpose of obtaining the history of Lawrence OX-5, Gnome and LeRhone aviation engines from the manufacturers.

Board of Officers Member

Lieut.-Col. John S. Sullivan, Air Service Aeronautics, is appointed a member of the Board of Officers created by Paragraph 7, Personnel Orders No. 27, Air Service, April 10, 1919.

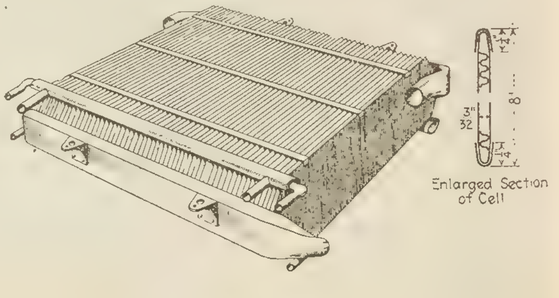


Fig. 3—Plate Type of Radiator Which is Set Into the Curve of the Upper Wing on La Pere Machines

News of the Army and Navy Air Services

Officers Change Stations

The following named field officers have been ordered to change stations as follows since April 3, 1919:

Lieut.-Col. Joseph E. Carberry, A. S. A., ordered from Army General Hospital, Hot Springs, Arkansas, to Rockwell Field, San Diego, California.

Major Harry E. Cross, A. S. A., ordered from Garden City, Long Island, New York, to Dayton, Ohio.

Col. Joseph C. Morrow, A. S. A., ordered from Cooperstown, New York, to Washington, D. C.

Lieut.-Col. Earl L. Canady, M. A., A. S. A., ordered from Washington, D. C., to San Francisco, California, thence Philippine Islands, for duty as Department Air Service Officer.

Lieut.-Col. Ira A. Rader, J. M. A., A. S. A., ordered from Ellington Field, Houston, Texas, to Americus, Georgia, to assume command of Souther Field and Aviation General Supply Depot.

Lieut.-Col. John N. Reynolds, J. M. A., A. S. A., ordered from Godman Field, Camp Knox, Stithton, Kentucky, to Washington, D. C.

Major Chester P. Dorland, J. M. A., A. S. A., ordered from Rockwell Field, San Diego, California, to Post Field, Fort Sill, Oklahoma.

Major Ralph P. Cousins, J. M. Aer., A. S. A., ordered from Payne Field, West Point, Mississippi, to Ellington Field, Houston, Texas.

Major Eugene Lazar, A. S. A., ordered from Washington, D. C., to Brooks Field, San Antonio, Texas.

Lieut.-Col. Harvey B. S. Burwell, J. M. A., A. S. A., ordered from Rockwell Field, San Diego, California, to Love Field, Dallas, Texas, to assume command.

Major Clinton W. Howard, J. M. A., A. S. A., ordered from Rockwell Field, San Diego, California, to Payne Field, West Point, Mississippi, to assume command.

Major Albert L. Sneed, J. M. A., A. S. A., ordered from Love Field, Dallas, Texas, to Washington, D. C.

Major Jacob H. Rudolph, A. S. A., ordered from Chapman Field, Miami, Florida, to Selfridge Field, Mount Clemens, Michigan, to assume command.

Lieut.-Col. Lawrence W. McIntosh, J. M. A., A. S. A., ordered from Selfridge Field, Mount Clemens, Michigan, to Ellington Field, Houston, Texas, to assume command.

Honorable Discharges

The following officers have been honorably discharged from the service of the United States, April 3:

April 3—Charles F. H. Johnson, Major, A. S., A. P.; Roland J. Houck, Second Lieut., A. S., A. P.; Walter P. McQuade, Second Lieut., A. S. A.; Ernest F. Willets, Second Lieut., A. S. A.

April 4—Philip Drinker, First Lieut., A. S. A.; Harry W. Bryan, First Lieut., Q. M. C.; David L. Rairden, First Lieut., A. S. A.; Arthur V. Moninger, Captain, A. S. A.

April 5—Milford H. Olds, Second Lieut., A. S. S. C.; Frank J Stamper, First Lieut., A. S., A. P.; Edward C. Russel, Second Lieut., A. S., A. P.; Walter E. Benjamin, Second Lieut., A. S. A.; John W. Davis, Captain, A. S. A.; Peter C. Borre, Second Lieut., A. S. A.

April 7—Raymond L. Branson, Second Lieut., A. S., A. P.

April 8—Frederick C. Wiggins, First Lieut., A. S. A.

April 9—Oswald H. Day, Second Lieut., A. S. A. P.; Dudley H. Hagan, First Lieut., A. S. A. P.; Malcolm MacDonald, First Lieut., A. S. A. P.

COL. WILLIAM N. HENSLEY, J. M. A., A. S. A.

Col. William N. Hensley is Rated Balloon Observer, Junior Military Aviator, Junior Military Aeronaut, and is Now in Charge of Airship Training and Construction, U. S. Army. He is Now Undergoing Training as a Dirigible Pilot. This Picture Was Taken in Front of the Dirigible Hangar at Wingfoot Lake Flying Field, Akron, Ohio, on the Day the First Army Dirigible Airship, the A-4, Was Assembled

Surplus Property Board

A Board of Officers to consist of the following personnel is appointed to determine the amount of surplus property of every kind in the Air Service:

Major Harry Graham, Junior Military Aviator, Air Service Aeronautics.

Capt. Ralph J. Moore, Air Service Production.

Capt. Louis B. Montfort, Air Service Aeronautics.

Capt. Frazer Hale, Air Service Aeronautics.

Dirigible Pilot James F. Shade will proceed from Washington, D. C., to Akron, Ohio.

Construction and Electrical Engineer A. W. Duff will proceed from Washington, D. C., to Langley Field, Hampton, Va., reporting upon arrival to the Commanding Officer, for temporary duty in connection with Photography of bomb sights and bomb trajectories.

Army Motor Vehicles for Sale

The Transportation Section announces that the Chief, Motor Transport Corps, has been ordered to sell not less than thirty thousand motor vehicles of various kinds. No announcement as to the manner of their sale has as yet been made but it will probably be in conformity with the plan outlined in a previous publication, to wit: "First, to manufacturers (each manufacturer to be offered the cars made by him); Second, the net surplus remaining after the above method has been followed will be disposed of to the public, either through auction or by sealed bids."

Air Service Advantages

Here are some of the reasons why you cannot afford to overlook this opportunity to join the U. S. Army in the Air Service, Aeronautics Division:

1. Highest branch of the Service.
2. An enlisted man has the opportunity of attending a Training School, where a three months' course is given in airplane construction, repair of and upkeep of airplane motors, and woodworking. In view of the fact that the airplane will without question be used to a very large extent commercially, the knowledge gained while in the Army could be put to very good advantage in civil life should the soldier desire to return to civil life after serving with the colors for three years.
3. Attention is also brought to the fact that the average salary for men between the ages of 20 and 25 years of age equals about $885 per annum. Compare this with the pay and allowances in the Army, figuring as follows, which is conservative:

Private—Pay per annum	$360.00
Room and Board—$40.00 per month	480.00
Clothing	170.00
	$1,010.00
Sergeant, figuring on same basis as above.	$1,178.00
Sergeant, first class, figuring on same basis as above	1,262.00
M. S. E., figuring on same basis as above.	1,610.00

After having completed a course at school a soldier has the opportunity of taking an examination for appointment as Aviation Mechanic, which when successfully passed gives an increase of 50 per cent per month to salary.

In addition to the above, free entertainment and athletic events are held, free medical attention, excellent opportunity for travel. You also have an opportunity of taking flying instruction, and after the prescribed course has been finished, which generally requires three months, you are entitled to an additional 50 per cent increase in pay. This additional pay does not apply, however, if you have been appointed to the grade of Aviation Mechanic.

Captain White's Record

Capt. Earl French White, Air Service, who flew a D. H. 4 plane with a Liberty engine from Chicago to New York without a stop on Saturday, April 19, in 6 hours and 50 minutes, is an experienced pilot. Previous to being commissioned he was a flying instructor at San Diego. He had three years' experience in the cavalry before he enlisted in the Aviation Section of the Signal Corps in 1915. He received his pilot's license on March 27, 1917. He was commissioned as a Captain in the Aviation Section November 8, 1917, and in January, 1918, qualified as a Reserve Military Aviator. In August he was stationed at Wilbur Wright Field, and later at the Technical Flying Field, at Dayton, Ohio. His home is Fairhope, Ala. Captain White was born in Minneapolis, Minn., July 12, 1888.

Colonel Rhinehardt Is Better

Lieut.-Col. Claude K. Rhinehardt, former Officer in Charge of Flying at Kelly Field, who was seriously injured March 22, when the ship in which he was flying fell from a height of about 50 feet, near Penn Field, Austin, Texas, returned to this field Monday, March 31. However, he is still far from being fit for duty, and has left the field on a 30-day leave.

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W. D. MOFFAT. . . . . . .*Vice-President*
W. I. SEAMAN. . . . .*Treasurer*
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Formerly Air Service Journal

Macon Aeronautical Exposition

THE plans for the Macon Aeronautical Congress, to be held May 2 to May 10, seem to indicate that the affair will be one of the big events of the year. As it is a public event and undertaken with the sole idea of arousing interest in the South in the possibilities of the airplane, it has secured the hearty support of the various manufacturers who will send exhibits, and the Army, Navy and the Post Office Department, who are doing all they can to make the week memorable in the annals of aeronautics.

It is to be hoped that the Macon exhibits will be so successful that they will be reproduced in other parts of the country. In this way great interest could be aroused both for the commercial development and the governmental encouragement of aeronautics. The flying fields have done a valuable service in this popularizing of aviation, but many places have not had the opportunity of as intimate a study of the aeronautic paraphernalia that arouses so much interest, and exhibitions of this kind will go far to satisfy this interest.

Airplane Inspection Needed

IMMEDIATE need for a supervised inspection of airplanes is again made apparent by the loss of a pilot when the wings of the machine he was flying came off in its test flight. Some years ago when the engineering knowledge of aeronautics was slight, it was thought that the only way a plane could be tested was by actual flight. To-day, with the sand test as a prime index to the characteristics of a machine, there should be a limitation put on constructors which would prevent the loss of life to the detriment of the whole development of aeronautics.

It is common knowledge that pilots can be secured to fly anything that has wings and power to lift them off the ground. Men of the widest experience have been known to take chances with machines which every aeronautical engineer of standing pronounced dangerous. During the war several instances of this happened, but it was then considered a part of the necessities of the situation. Pilots, notoriously daring as a rule, should have protection against themselves, and not be allowed to take chances in machines of new types that have not had every test possible made before they leave the ground.

With the sale of planes to the public, there will be needed an impartial body to pass on the design, construction and rigging of all airplanes that are allowed to navigate over inhabited areas. Any one of the three elements of machines which are used without the supervision of expert engineers or airplane mechanics may be the cause of doing more to hold back the commercial development of the industry than any other single factor.

Readerships in Aeronautics

ONE of the best guarantees of progress at present is the recognition on all sides of the vital importance of research work. The Government have given it a definite place in their scheme under the Air Ministry, and in addition public educational corporations must inevitably make provision for it. Already chairs of aeronautics are to be endowed in the Universities of Cambridge and London, and it has been suggested that similar departments should be established in connection with our provincial universities, many of which are especially strong on the scientific and technical side, and are more directly linked up with the great engineering and industrial centres than the older universities.

Frankly the idea that the Air Ministry should make itself responsible for a chair of aeronautics at every university seems to us impracticable. Such provision would be in excess of the needs, and the cost would be disproportionate to the number of students who could profitably specialize in this field. But a quite practical halfway course has been suggested, which might meet all reasonable needs. This is that, with the aid of Government grants supplemented by private benefactions, readerships in aeronautics should be established in connection with the existing departments of engineering.

Really aeronautics is but a new branch of engineering in the largest sense. Stability is the span of a bridge and stability in an aeroplane rests ultimately on the same principles and mathematics; with the difference that in the one case the conditions are stable and fixed while in the other they are extremely fluid and variable.

It seems to us quite feasible that aeronautics should be taken as one subject in the engineering course, and on graduation a percentage of really suitable students might pursue it as their special line. * * * *

This alternative plan would bring aeronautical study definitely within the scope of our universities, and incorporate it in our engineering schools to which it properly belongs. And as far as one can foresee it would meet all needs for some time to come.—*Aeronuautics, March* 27, 1919.

Naval Air Achievements

THE Naval Air Service has by its recent achievements added greatly to its reputation. Quietly, it built during the war an organization which was considered efficient and sound. Little or no publicity was given to either personnel or equipment. Now, however, that the censorship is lifted the navy is displaying to the public the qualities of its war products.

The F-5-L type which was designed and constructed at the Naval Aircraft factory has succeeded in breaking all seaplane endurance records by remaining in the air over twenty hours and covering an estimated distance of 1,250 miles. To accomplish this feat, more than human perseverance was required. The motor problem was solved, and demonstrated that two Liberty engines could run a sufficient number of hours to make the Newfoundland-Azores trip possible. The speed in the trial flight was of minor importance, the main importance being the performance of the engines.

With this record flight made on the eve of the start of the NC class of seaplanes for Newfoundland high hopes are raised for the success of the transatlantic flight which ought to occur early this month. If the crews that have been detailed for this work can pilot their aircraft into a Spanish port, it will add great lustre to the American navy's cup of victory.

Meantime Commander Grow and his crew are to be felicitated upon their exploit, which, it is reported quietly in usually well informed quarters, was even more impressive than the current newspaper stories indicate—at least so far as the distance covered is concerned.

It will not be astonishing if further laurels are acquired by the F-5-L boats.

An Authoritative Book on the American Air Service

Capt. Arthur Sweetser Tells Without Bias the Full Story of Our War Time Aeronautical Achievements

The most important book that has been written on the aeronautical achievements of this country has just appeared. Its title, "The American Air Service," is indicative of its scope, but until its three hundred odd pages of text are scanned and the mass of statistical facts viewed in the perspective of an accomplished development, no appreciation of the work done by the American Air Service is possible.

Its author, Capt. Arthur Sweetser, served during the period of the war at the aviation headquarters in Washington. He was detailed to the duty of historian. Serving in this capacity, he had access to all of the files of the aviation branch of the War Department. Thousands of documents—reports, letters, cablegrams and charts—passed through his hands, and from them he gleaned the material necessary to make his book.

The Author's War Experiences

Mr. Sweetser's war experiences began, however, long before this country declared war on Germany. He was in Europe as a newspaper man when the war started, and with other correspondents started from Paris to the scene of action at the first clash of arms. He was arrested as a spy as soon as he reached the zone of fire, and went through all of the experiences that made a newspaper man's life border on tragedy in those days.

On his return to this country Mr. Sweetser became interested in the work of the Committee on Public Information, and was engaged there until he was commissioned in the Air Service. He was attached at first to the Aircraft Production Board, and accompanied General Joffre and Balfour on their trip of inspection in this country. He was later attached to the office of the Director of Military Aeronautics. Regarding his work in the office in connection with his history of the Air Service, Mr. Sweetser has said:

"Out of the overwhelming mass of detail, I have endeavored to select the high lights of historical importance so as to provide new information for those already familiar with parts of the subject, while not confusing those unfamiliar with it in a maze of detail. If this book serves to bring about a fairer and more complete judgment of the whole situation, if it explains the romance and achievements, as well as the difficulties and failures, of the aviation project, I shall feel that it has been worth while."

Story Told for the First Time

In this book for the first time is told the whole story of the American Air Service in the war, undistorted by the prejudices and passion which made it the storm center of our military preparations. The story of how an unprecedented program was adopted and carried out—of teaching men to fly, to use machine guns, cameras and bombs in the air, of developing new industries and converting virgin forests into airplane wings and fuselages, of erecting airdromes and factories in England and France, and finally of meeting the enemy fliers over No Man's Land—is a tale so complex as in some measure to justify the almost universal misunderstanding of the Air Service, even among its friends. Captain Sweetser has admirably performed his task of drawing from the stupendous mass of detail a lucid and convincing narrative of the development of the aviation program and the Air Service. Attached to the headquarters of the Air Service in Washington from the very beginning of this development, he had access to every cablegram, letter, report, and document that might throw light on the aviation program. His book is authoritative as to fact, exhaustive in scope, and intensely interesting in treatment.

Capt. Arthur Sweetser, A. S.

Beginning with the early experiments of Langley and the Wrights, Captain Sweetser traces briefly the development of aviation in America up to the entry of the United States into the war. He then shows how the Air Service was first projected as an arm of the military establishment proportioned to the other arms, and how in response to requests from the Allies the program was later expanded into an attempt to create an immense independent striking force, which should not only give the supremacy of the air to the Allies, but should also constitute America's greatest contribution to their actual military strength. Captain Sweetser next takes up the separate problems of the training of the fliers, the training of the great ground force, the production of engines, culminating in the development of the Liberty Motor, and the development of plane construction, first bringing the story down to the disruption of the Air Service and the new start after the storm of May, 1918. At this point he examines the real meaning of the program upon which the United States had embarked and shows its essential impossibilities. Nevertheless, an immense ground-work had been laid during the first year, which was apparent in the rapid progress made under the reorganization before the termination of hostilities.

Interesting Chapters

Captain Sweetser brings the whole story down to the signing of the armistice, not only in training and aircraft production at home, but in the actual work of the Air Service overseas. The exceedingly interesting concluding chapters deal with the work of the fliers in the United States, including the establishment of the Air Mail Service, the organization of the Air Service in France, and the achievements of American aviators and balloon-men on the battle front. This portion of the volume, which contains enthralling first-hand accounts of aerial battles, bombing expeditions and parachute descents under fire, proves conclusively how great was the accomplishment of the American Air Service in a space of little over a year. The record of American aviators at the front is a final refutation of the charge of "failure" so often laid to the Service. In the words of General Pershing: "Our aviators have no equal in daring or fighting ability, and have left a record of courageous deeds that will ever remain a brilliant page in the annals of our Army."

Secretary Baker's Introduction

Secretary Baker in the introduction he has written for the book says: "As I have read Captain Sweetser's manuscript it has seemed to me that he tells candidly and fully the difficulties and also the achievements. The record he gives is substantially that contained in the official proceedings of the War Department."

Perhaps the greatest service the book will perform, if it is read by Congressmen and government officials who have the future of the Air Service in their control, is that it may impress them with the utter futility of attempting to create an air service quickly and in an emergency. Captain Sweetser's account of the parsimonious support that was given before the war to aviation is the clearest vindication of the expenditure of such vast sums during the emergency. A fraction of the billion dollars required would have not only placed the United States in a position of leadership, but would have prepared the way for wartime development.

The book's unbiased point of view will appeal to all its readers. It will please because it states facts and does not attempt to give controversial matters any attention. Anyone who has served in any branch of the Air Service will find in attractive form the basic facts of his section. As a store house of authoritative data, it will serve as a reference book of the greatest value. It is published by D. Appleton and Company.

The author, who was called to Europe on work connected with the Peace Conference, makes acknowledgment for valuable assistance to his wife, Capt. E. H. Cumston, statistical officer of the Air Service and Francis G. Wickware, who, in his absence, edited the manuscript. The author's royalties on the sales of the book are devoted to the American Red Cross.

Ball Bearings Combination

Of interest to all users of bearings is the just announced combination, effective May 1, of the Hess-Bright Mfg. Co., the S. K. F. Ball Bearing Co., the Atlas Ball Co. and the Hubbard Machine Co. The new company, under the name of S. K. F. Industries, Inc., will offer a comprehensive line of ball bearings, including the Hess-Bright deep-groove type, S. K. F. self-aligning radial and thrust bearings and ball bearing pillow-blocks and shafting hangars.

Through the medium of its engineering organization, backed up by a well equipped laboratory, the new company will be able to place at the service of bearing users the knowledge gained in many years of study of anti-friction bearings of all kinds. On request, manufacturers' problems will be analyzed in detail and that type of bearing recommended which (independent of sales considerations) is best suited to the conditions met. In addition the laboratory staff will carry on research studies affecting anti-friction bearing design and application.

S. K. F. Industries, Inc., is the consummation by physical consolidation of a merger, begun some time ago of the four companies mentioned under the direction of B. G. Prytz, President, W. L. Batt, Vice-President, J. P. Walsh, Comptroller, and S. B. Taylor, Sales Manager. The principal office will be at 165 Broadway, New York City, with branches at Boston, Philadelphia, Atlanta, Buffalo, Cleveland, Detroit, Cincinnati, Chicago, and San Francisco.

Britons Still Delayed

When this issue of Aircraft Journal went to press bad flying weather prevailed off the coast of Newfoundland, and the British trans-Atlantic machines still remained in their hangars.

There have been eight entries in the London *Daily Mail* $50,000 competition, but only six of them have made public their activities. They are all of British design and build except the one to be used by Captain Sunstedt, which is being rebuilt by the Whittemann-Lewis Aircraft Corp. of Newark, N. J. They are:

F. Raynham, Martinsyde..........	285 hp.,	100 m.p.h.
S. Pickles, Fairey..................	375 hp.,	120 m.p.h.
Major J. C. P. Wood, Short.........	350 hp.,	95 m.p.h.
H. G. Hawker, Sopwith............	350 hp.,	100 m.p.h.
Capt. A. Payse, Whitehead.........	1600 hp.,	115 m.p.h.
Capt. Sydney Bennett, Handley Page	......	......
J. A. Peters, Alliance..............	450 hp.,	100 m.p.h.
Capt. H. Sunstedt, Seaplane......	440 hp.	......

Lloyds' Betting Odds

The betting odds posted at Lloyds, London, are 4 to 1 against any machine making the flight in April, and 2 to 1 against any making it in May.

The second group of odds was 2 to 1 that the Martinsyde machine would be successful, and 2 to 1 that the Sopwith machine would not. Capt. C. W. F. Morgan, navigator of the Martinsyde, made further bets at new odds, and says that he has put up everything he owned.

"As a matter of fact," he added, "I have bet my shirt that we will do it."

Considerable sums are being bet in St. John's, at odds reported by Lloyds. Apparently because of the great personal popularity of Captain Morgan, the wagers are chiefly being made on Martinsyde success. Plans are being made for sweepstakes pools on the flight. "Sweeps," as they're known here, are a real institution in St. John's. They are a feature of every season, and thousands take chances in them. The principal prizes run up to $1500 for the person who holds a ticket for the first or last steamer in from the ice fields.

"Sweeps" on the flights will involve the day and of flights, whether landing will be made in Ireland hour of leaving, the day and hour of arrival, time or England, and such details.

Urges Air Service

Demands that the United States establish overseas routes for speedy mail and express service were made in the general report of the sixth convention of the National Foreign Trade Council, which came to a close April 26. The report was read by James A. Farrell, President of the United States Steel Corporation.

The plan for this air service was launched at the convention by Col. Hiram Bingham, former Yale professor, now in the Air Service.

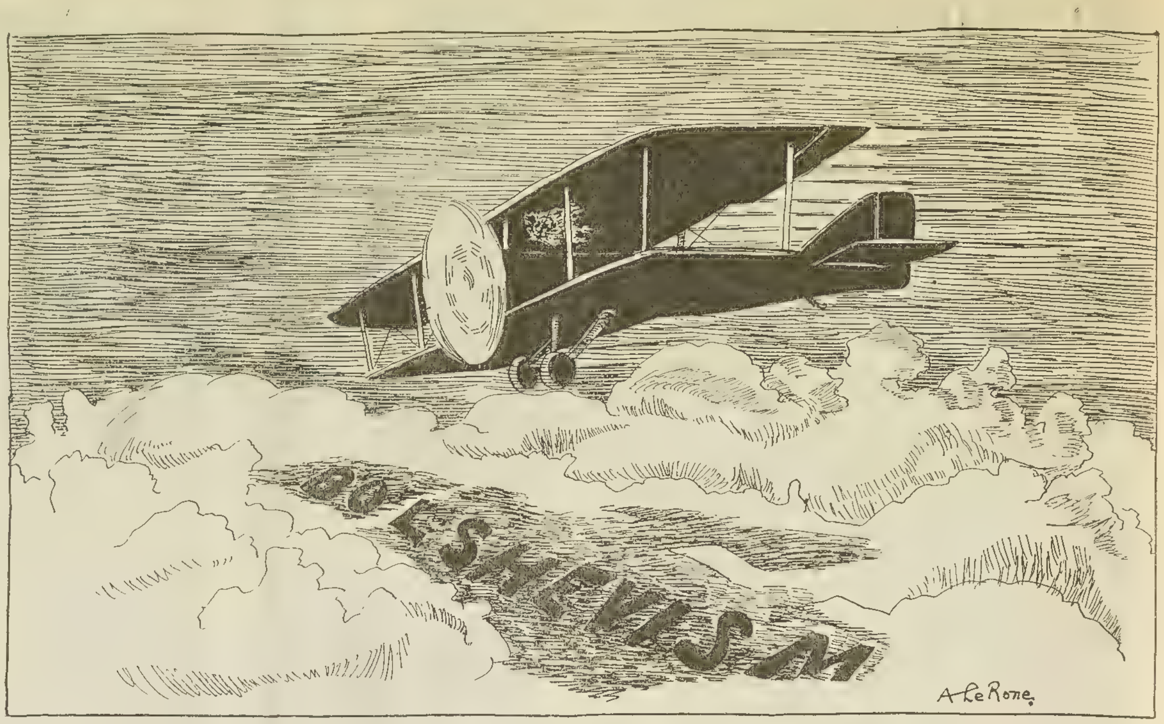
"This convention urges Congressional consideration of suitable plans for developing aerial navigation," reads the report. "The establishment of the necessary aids to such navigation, the investigation and development of the fundamental principles of commercial aeronautics, the promotion of airship service to overseas countries, are matters which demand the present establishment of a separate department of the Government.

"The convention suggests to local Chambers of Commerce the advisability of having public airdromes in all centers that expect to develop large foreign markets."

Airplanes and Architecture

William Van Alen of the firm of Severance & Van Alen, New York architects, and Pentz, Van Alen & Durkee, makers of the Pentz airplane compass, while at his office in Palm Beach, this past season, was called upon by a client to select the most advantageous position for the location of a new villa. The property extending from the Ocean to Lake Worth comprises some twenty acres and at the present time is practically inpenetrable on account of the jungle which runs through it, connecting up some low land containing water, which requires filling in. The contract road bisects the property and the runways through the jungle not far distant from the property, did not afford a sufficient point of advantage to determine the contour of the property, which had to be obtained before Mr. Van Alen could start on the layout of the architectural features.

His experience recently in connection with certain War work, required him to make several flights in airplanes and in consequence the advantage of using an airplane for the obtaining of this information appealed to him at once. He immediately crossed the lake to West Palm Beach and succeeded in having Mr. Kantner, the pilot at the Airdrome, take him up and they flew together over the property until Mr. Van Alen had obtained the information he sought.



Stop THIS Trans-Atlantic Flight

Consecutive Loops

Lieut. P. W. Maynard, Air Service, A. E. F., has broken the loop-the-loop record of Lieut. Joyce by looping 318 at A. S. Production Center No. 2 at Ramorantin, France, on February 12 in 67 minutes.

With a determination to exceed Lieut. Joyce's record, he climbed into a Sopwith-Camel, in which he had had a narrow escape a few hours earlier by coming out of a 1,200 feet fall dangerously near the ground, enough to daunt the average flyer. He shot off the ground straight toward the silvery reflection of the big full moon, the 160 Monosoupape motor making the flight spectacular.

Securing enough altitude, approximately 2,000 feet, he started on his record breaking looping journey. He simultaneously circled the field so that 50 to 52 loops would be made in each circuit, averaging five loops a minute or rather 12 seconds per loop. By the time he had circled the field over six times he had broken the world's loop record for time and number.

It is reported that his previous greatest number of loops was 16, although his acrobatic skill had been previously demonstrated in the execution of vrilles, sideslips, Immelman turns, barrel rolls and sky-rock rolls. In addition to his regular performance he executed 18 loops after his main pressure gasoline supply tank became empty, for instead of gliding to earth he switched on his gravity emergency tank and threw in the extra loops for good measure nearer the ground. On account of the known fact that the gravity feed is useless in the upper halves of the loops, while the plane is upside down, this added further zest to the trip.

Seek Landing Fields

Capt. Charles J. Glidden, A. S. A., is asking chambers of commerce and boards of trade throughout the United States to send answers to the following questions to him at No. 104 Broad Street, New York City:

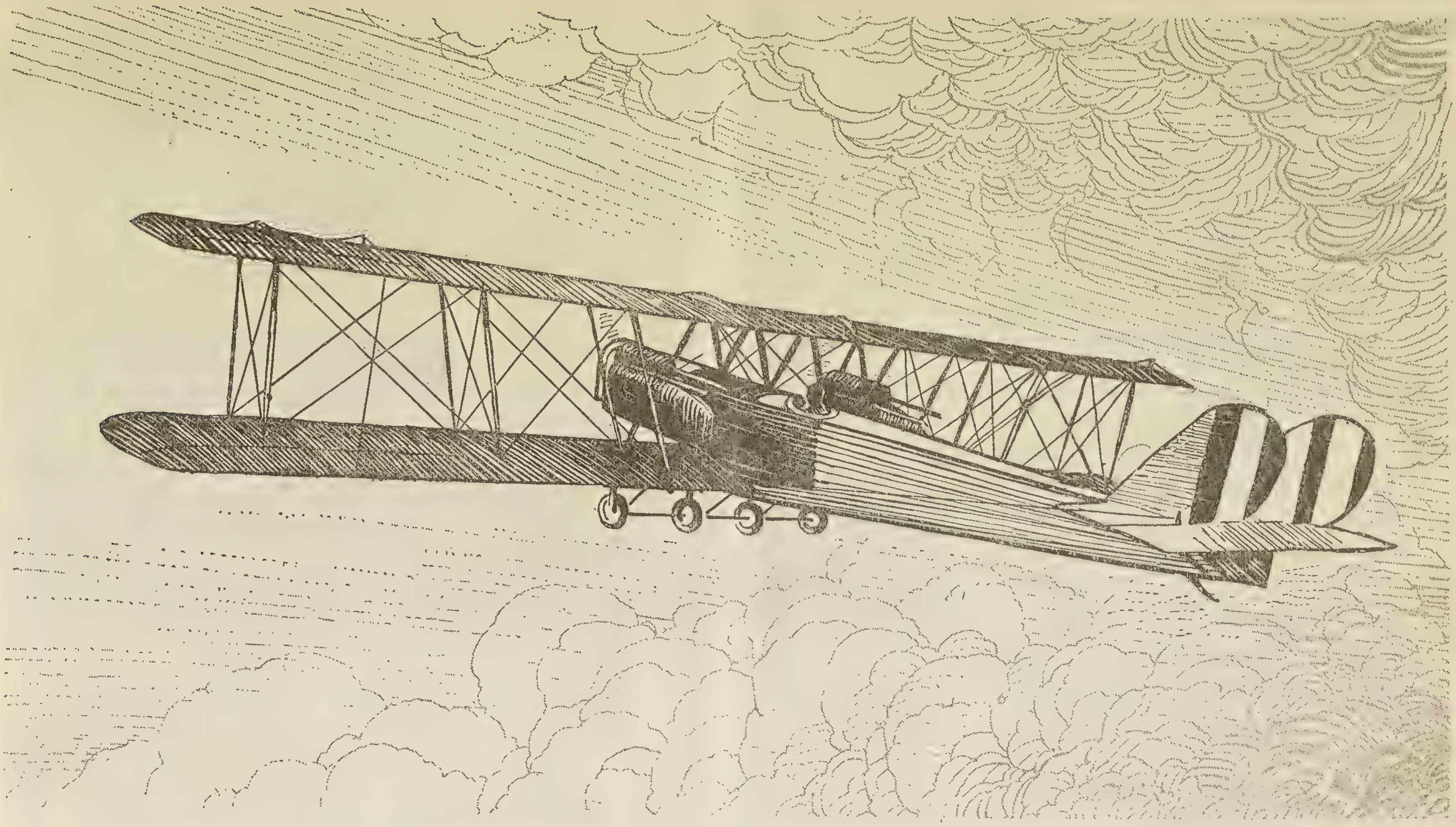
1. Under what conditions, lease or purchase, can a suitable landing field be obtained in or near your city or town; size 1500 feet by 500 feet. Must have a hard surface and not surrounded by trees or other high objects.
2. Name of owner and address.
3. Direction of field from your Post Office.
4. Distance.
5. Transportation facilities between field and Post Office.
6. Any other information which can be used in support of argument to place your city or town on the aerial mail, passenger, and merchandise routes.
7. This information will aid materially in planning a National Aerial Service and should be sent in, in duplicate, typewritten, on paper 8 inches by 10 inches.

Victory Buttons

A lapel button to be known as the Victory Button, for wear on civilian clothes, will be issued to all officers, enlisted men (excluding members of the Students' Army Training Corps), field clerks, and members of the Army Nurse Corps, who served honorably on active duty in the Army of the United States for a period of fifteen days at any time between April 6, 1917, and November 11, 1918. The button will be of silver for those wounded in action, and bronze for all others.

For the present, the Victory Button will be issued at time of honorable discharge to those entitled to it and to those who have already been honorably discharged. Later, the button will be issued to all remaining in service entitled to it.

Those who have been discharged before a supply of buttons was available for issue may secure a button by mailing to the supply officer of the nearest military post, camp or station, including a recruiting station, their original discharge certificate or a true copy thereof prepared on the form provided for the purpose, or, in the case of officers to whom no discharge certificate was issued, their discharge order or a true copy thereof. The true copy of a discharge certificate or of a discharge order must be executed by a civil officer empowered to administer oaths and be a full, literal and complete copy of the original and contain all written or printed matter appearing on both sides of the discharge certificate or discharge order.



Valsparred in war and peace—

THE Glenn L. Martin "bomber," no longer needed for warlike purposes, has demonstrated its value as a commercial machine—

And it's still Valsparred, of course.

Recently this airplane, equipped with two Liberty motors, flew from Pittsburgh to Washington (175 miles) in one hour and fifteen minutes, making a record.

The "fast express" airplanes now being developed to carry on the work of peace, *must* be varnished with Valspar to attain highest efficiency. No other varnish embodies both the elasticity necessary to withstand the terrific vibration, and the water-proofness necessary to resist the erosion of moisture particles driven at enormous speed against the airplane surfaces.

Valspar resists all of the destructive effects of high speed and hard usage in airplane service and is *the only varnish that is actually weather-proof and water-proof.*

Valentine Products

used by the world's leading airplane makers include:

- Valspar Varnish
- Valspar Low Visibility Gray Enamel
- Valspar Olive-Brown Enamel
- Valspar Black Enamel
- Valspar Khaki Enamel
- Valspar Filler (Wood)
- Valspar Primer (Metal)
- Valspar Primer (Wood)
- Valspar Aluminum Paint
- Dipping, Spraying and Brushing coatings of all kinds
- Quick-Drying Insignia Colors
- Valenite
- Valenite Enamels

VALENTINE'S
VALSPAR
The Varnish That Won't Turn White

VALENTINE & COMPANY
456 Fourth Avenue, New York
Largest Manufacturers of High-grade Varnishes in the World
ESTABLISHED 1832
New York Boston Chicago VALENTINES VARNISHES (Trade Mark) Toronto Amsterdam London
W. P. FULLER & Co., San Francisco and Principal Pacific Coast Cities

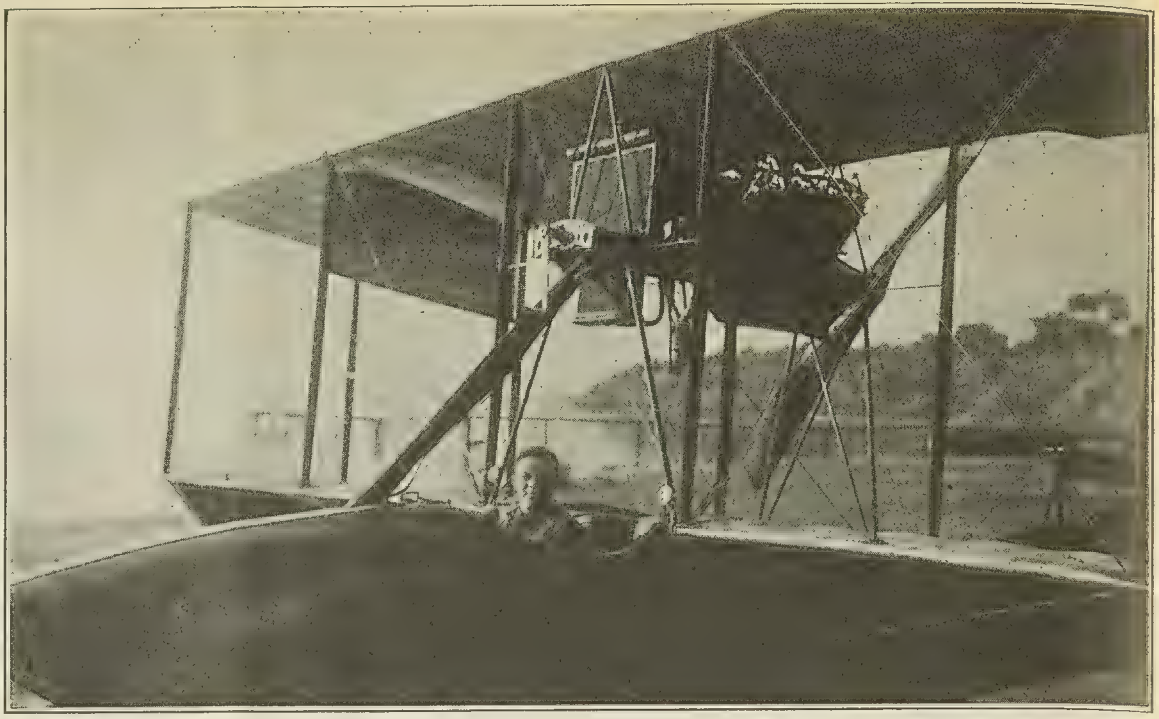
Locklear's Bold Plan

Second Lieut. Ormer L. Locklear, Army aviation instructor, is so firmly convinced that a non-stop flight from New York to San Francisco is a certainty that he is planning to attempt one as soon as he gets out of Uncle Sam's service.

The big feature of his plan will be to take on gasoline through a dangling tube from other "ships" high in the air at various points along the route. The number of times it will be necessary to refill his tank will depend altogether upon the capacity of his tank and the speed of the machine. It may require three or four mid-air refillings, and perhaps not as many.

The big point in favor of his scheme, the lieutenant says, is its practicability, as demonstrated by experience in flying machines in parallel courses within a few feet of each other, and by his stunt in dropping from one "ship" to another a year or so ago. He says: "The principle of a non-stop flight across the continent is to show the endurance of the 'ship' and the endurance of the men running it. It is a much more sensible thing to try flying acoss the continent before attempting a flight across the Atlantic. It is about 3000 miles by rail and about 2200 miles by air from this city to San Francisco. If the weather is favorable, as it ought to be next month, there ought not to be any trouble in completing a non-stop flight if the fellows along the route come up with their gasoline on schedule time."

Lieutenant Locklear is a Fort Worth, Texas, boy and is an instructor of aviation at Barron Field, Fort Worth. He made flights in his own airplane for two years before enlisting in the Army aviation service, and the Army found him so useful down in Texas that it kept him there to teach other fliers, thus preventing him from flying on the other side. He has been living in the air about four years.



Frank Mills in a Curtiss M. F. Type of Flying Boat

Frank Mills' New School

Frank Mills, well known as one of the most skilful pilots in the United States, a graduate of the Curtiss school at San Diego, Cal., with over 2,000 flying hours to his credit as a senior flying instructor in the Air Service, is about to open the old Essington, Pa., Water Flying School. It was formerly operated by Robert E. Glendenning and later was taken over by the U. S. Air Service and called Chandler Field. The course will cost $400.

Ocean Airship Fare $240

Vickers, Ltd., are about to start a transatlantic air service with airships which the company was building for the British Navy, when the armistice was signed and which are no longer needed, the London *Pall Mall Gazette* says. The passenger rate will be £48 and mail will be carried at the rate of £405 a ton.

The pioneer ship will have a gas capacity of 1,200,000 cubic feet and engines of 1,000 horsepower. Larger ships are being designed to carry 200 passengers.

"THE SHARK," FIGHTING BOMBER

L-W-F ENGINEERING COMPANY, Inc.

COLLEGE POINT, L. I.

Aviation Ball

One of the first great social events in New York since the winning of the war and the return from abroad of many of America's airmen, the Aviators' Ball, at the Ritz-Carlton Hotel on Saturday, April 26, turned out to be an affair of such color and brilliancy that even a New York post-bellum and post-Lenten season will have difficulty to dim the memory of it.

Army fliers, Naval aviators and Marine airmen —some of them arriving by plane—predominated in the throng that gathered for the occasion, although officers of practically every branch of the service, representatives of foreign corps and New York's society, could hardly be said to have been in the minority. More than two thousand made use of the six rooms given over to dancing.

Although no official report has as yet been issued by Lieut.-Col. Grayson, M. P. Murphy, treasurer of the Air Service Memorial Fund, under whose auspices the ball was held, it is estimated that the fund received an initial contribution of between $10,000 and $15,000 as a result of the evening. The committee, which includes as well Major Thomas B. Hitchcock as chairman and Major Geoffrey H. Bonnell as secretary, hope that this fund will take some permanent form of a memorial to the American aviators lost over the lines, and "that their supreme sacrifice may remain ever before us, and the service in which they gladly gave their all may grow greater with the years." The exact nature the memorial is to take will be decided upon and announced by the committee in the near future.

The grand ballroom was encircled with boxes, and here the entertainment continued until close to midnight. A special performance of the Ziegfeld Midnight Frolic, staged by Ned Wayburn, was given. This was followed by a number of tableaux arranged by Ben Ali Haggin depicting historical triumphs of the Allies.

In the main dining-room, Dorothy Dickson and Carl Hyson, now appearing in "The Royal Vagabond," presented a number of special dance numbers. Michio Ito appeared here at supper time.

Dancing was practically continuous in the Palm Court, the Pall Mall Room, and the Japanese Room, all of which were appropriately decorated for the occasion.

The committee in charge of the dance consisted of Lieut. Paul F. Baer, A. S. A.; Lieut. Gordon Balch, U. S. N. R. F.; Lieut. H. L. Benjamin, U. S. N. R. F.; Capt. Douglas Campbell, A. S. A.; Lieut. David Coddington, U. S. N. R. F.; Lieut. Heywood F. Cutting, A. S. A.; Lieut. Edward Donovan, A. S. A.; Lieut. Bradley T. Gaylord, A. S. A.; Lieut. Thomas B. Hitchcock, Jr., A. S. A.; Capt. Arthur R. Jones, A. S. A.; Lieut. R. W. Knowles, U S. N. R. F.; Major Kenneth R. Littauer, A. S. A.; Lieut. A. J. Lowrey, U. S. N. R. F.; Lieut. W. G. McAdoo, Jr., U. S. N. R. F.; Major James A. Meissner, A. S. A.; Capt. E. V. Rickenbacker, A. S. A.; Lieut. Francis Simmonds, A. S. A.; Lieut. H. N. Slater, U. S. N. R. F.; Lieut. George Tiffany, A. S. A.; Lieut. Cornelius V. Whitney, A. S. A.; Lieut. Alan Winslow, A. S. A., and Lieut. George R. Young, A. S. A.

The program committee was headed by Miss Marion Tiffany, chairman, while a number of prominent names appeared as patronesses and patrons for the evening.

Some of those who secured tables in the ballroom were Mrs. Frederick W. Vanderbilt, Mrs. Francis M. Whitehouse, Mrs. Otto H. Kahn, Mrs. William Woodward, Mrs. George F. Baker, Walter J. Salmon, Laurence LaTour Driggs, Mrs. Frederick W. Whitridge, Mrs. Percy R. Pyne,, Mrs. James W. Gerard, Mrs. F. Burrall Hoffman, Mrs. Florence Ziegfeld, Mrs. Percy H. Stewart, Mrs. Benjamin Thaw, Mrs. William K. Vanderbilt, Jr., Mrs. Harry Payne Whitney, Clarence H. Mackay, Mrs. Edward N. Breitung, T. A. Gillespie and L. H. Pelouze.

Boxes were arranged about the balcony of the main dining-room, and among the holders, all of whom entertained supper parties, were Mr. and Mrs. William H. Crocker, Mrs. H. Fairfield Osborn, Mr. and Mrs. Will Rich, Col. F. E. Drake, Mrs. John R. Drexel, Mrs. Gifford A. Cochran, Mr. and Mrs. Warren McConihe, Mrs. George Creel, Thomas Hitchcock, Jr., Mrs. Lewis Gibb, Mrs. Charles Hudson Pope, Mrs. H. L. Preston, Mr. and Mrs. Herbert L. Satterlee, A. H. Flint and B. B. Goldsmith.

Tables in the dining-room also were reserved for Mr. and Mrs. Newbold Le Roy Edgar, Lieut. Joseph C. Baldwin, Jr., Mr. and Mrs. Jerome N. Bonaparte, Mr. and Mrs. John Jay Chapman, Mr. and Mrs. Cornelius N. Bliss, Mr. and Mrs. David Helier, Mrs. J. Borden Harriman, Lieut. and Mrs. Robert Howard Gamble, Mr. and Mrs. Sailing W. Baruch, Mr. and Mrs. Charles S. Brown, Enrico Gill, Ernest Wiltsee, Richard B. Pennock, Clifford B. Harmon and S. Montgomery Roosevelt.

British Aircraft Work

Comparison of Anti-Submarine Patrol and Convoy work by Airships and Planes:

	Airships	Planes	Ration in Favor of Airships
June-Dec., 1917:			
Patrols per craft........	42	18	2-1
Hours flying per craft....	228	36	6-1
Miles flying per craft.....	6452	2201	3-1
Escorts flying per craft...	6	1.6	4-1
Jan.-April:			
Patrols per craft........	37	17	2-1
Hours flying per craft...	241 hrs.	34 hrs.	7-1
Miles flying per craft....	6316	2081	3-1
Escorts flying	9	1.3	7-1
Men per hour flight......	2.3	4.7	2-1
Hours flight per man.....	.65	.24	2-½-1
Miles per man..........	52	47	..

THE AEROMARINE PLANE AND MOTOR COMPANY

Will Specialize in Filling the Individual Requirements of

THE UNITED STATES
ARMY AND NAVY

—and—

PRIVATE INDIVIDUALS

Aeromarine Plane & Motor Company

Factory—Keyport, N. J. New York Office—Times Bldg.

Member Manufacturers' Aircraft Association

Surburban Plane Delivery

One of the first sales of airplanes for use in delivering merchandise to suburban customers has been made by the Curtiss Aeroplane and Motor Corporation to L. Bamberger & Company, in Newark, N. J. Within the next few weeks, the company will inaugurate a regular aeroplane delivery service between their main store in Newark and the Oranges, Montclair, Trenton and Asbury Park. They will use a Curtiss JN-4D training plane with an especially constructed body for package carrying.

Pilot A. Livingston Allan in a Curtiss JN-4D Merchandise Delivery Airplane

The purchase of the plane came as the result of experiments which the company carried on during the time of the New York harbor strike when great difficulty was experienced in getting deliveries from the New York branch to the main store.

Goods intended for the Newark store were sent to Garden City, L. I., via motor truck, loaded into the Curtiss machine and, 40 minutes later, Pilot A. Livingston Allan landed the plane, carrying 175 pounds of merchandise, in Ballantine Parkway from where the transfer to the store was made.

The experiment proved so successful in the emergency test that the company immediately ordered an airplane to be used in making deliveries during the summer months to the cities along the New Jersey shore.

The service may soon be extended.

Answers to Correspondents

All bona fide inquiries will be answered by letter to the inquirer and included in these columns. Questions should be accompanied by stamped addressed envelopes.

J. L. S.—To secure a license for civilian flying you should write to the office of the Joint Army and Navy Board of Aeronautical Cognizance, Room 232, Building D, 6th and B Streets, Washington, D. C., addressing Lieut. A. J. Clayton.

S. S.—What is an ornithopter? An ornithopter is a type of flying machine propelled by flapping surfaces. Though many types have been suggested none has given any indication of possible success.

J. H. F.—The time made by pilot Leon D. Smith in his air mail flight from Washington to New York, April 11, was 1 hour and 58 minutes—an average of 111 miles an hour. His machine was equipped with a 150 hp. Hispano-Suiza engine and carried 157 pounds of letter mail.

R. B. C.—What is the best wing section for an airplane? There is no such thing as the best wing section for an airplane. Every wing section has to be adapted to the special type of machine on which it is intended to use it. Thus a very fast machine for military purposes will employ a section of small camber or depth, of low lift but very high aerodynamic efficiency such as the R. A. F. is for instance. In a heavily loaded passenger carrying plane, it may be better to employ a wing of heavy camber, with a high lift, even if the efficiency of the wing is small. Over a hundred good wings are now available.

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Essington Aviation School

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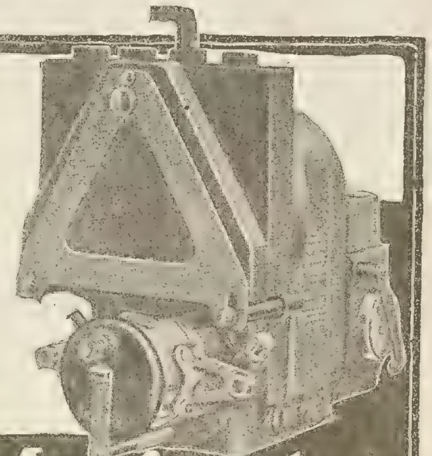

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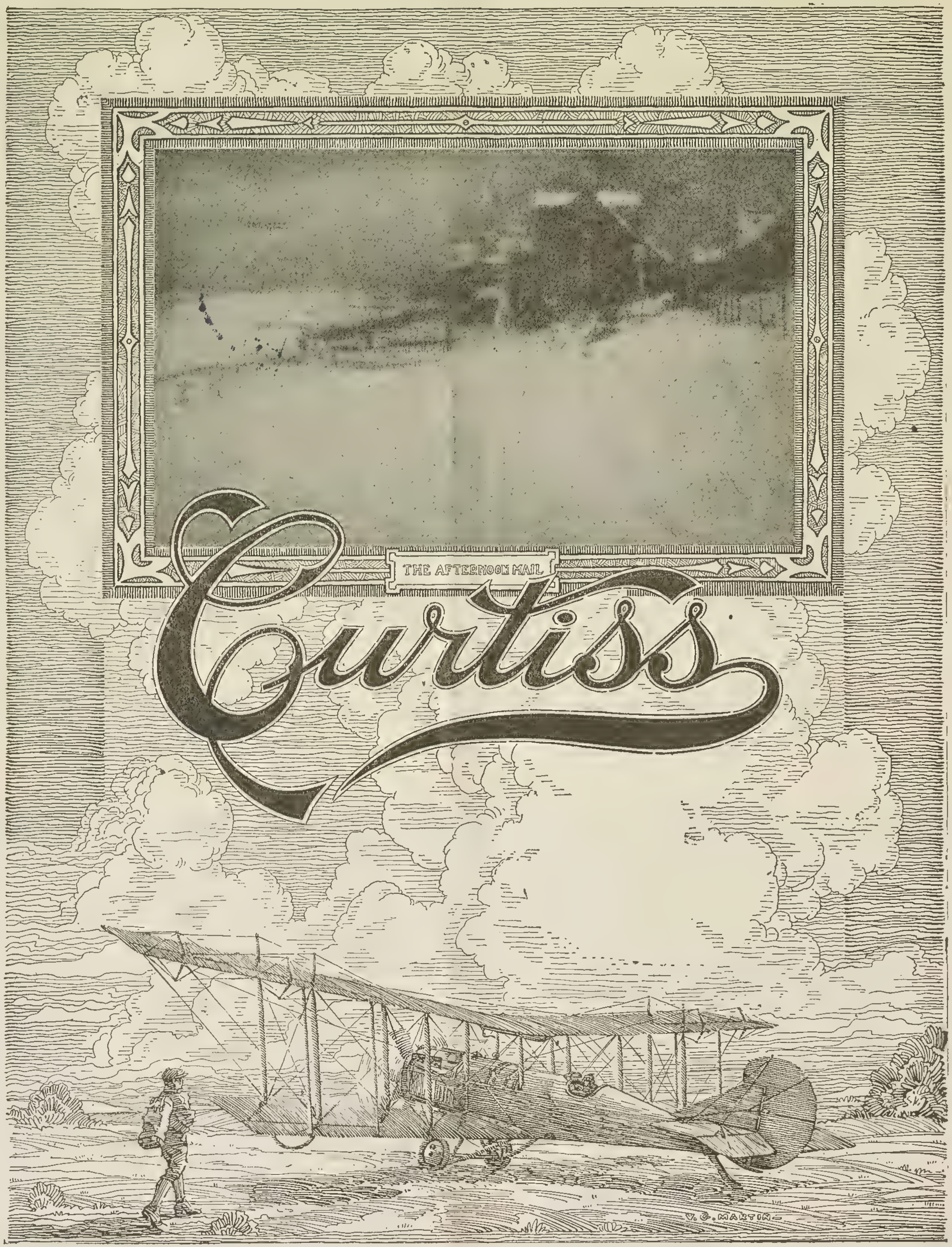

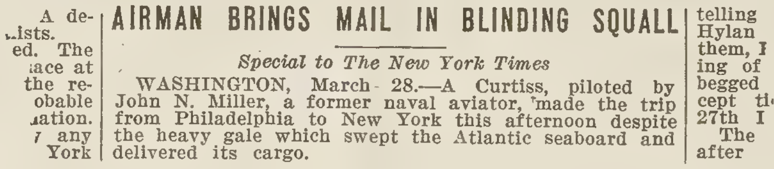

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AIRMAN BRINGS MAIL IN BLINDING SQUALL

Special to The New York Times

WASHINGTON, March 28.—A Curtiss, piloted by John N. Miller, a former naval aviator, made the trip from Philadelphia to New York this afternoon despite the heavy gale which swept the Atlantic seaboard and delivered its cargo.

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CURTISS AEROPLANE AND MOTOR CORPORATION, *Sales Office:* 52 VANDERBILT AVE., NEW YORK CITY
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AIRCRAFT JOURNAL

May 10, 1919 *Every Saturday* *Price Ten Cents*

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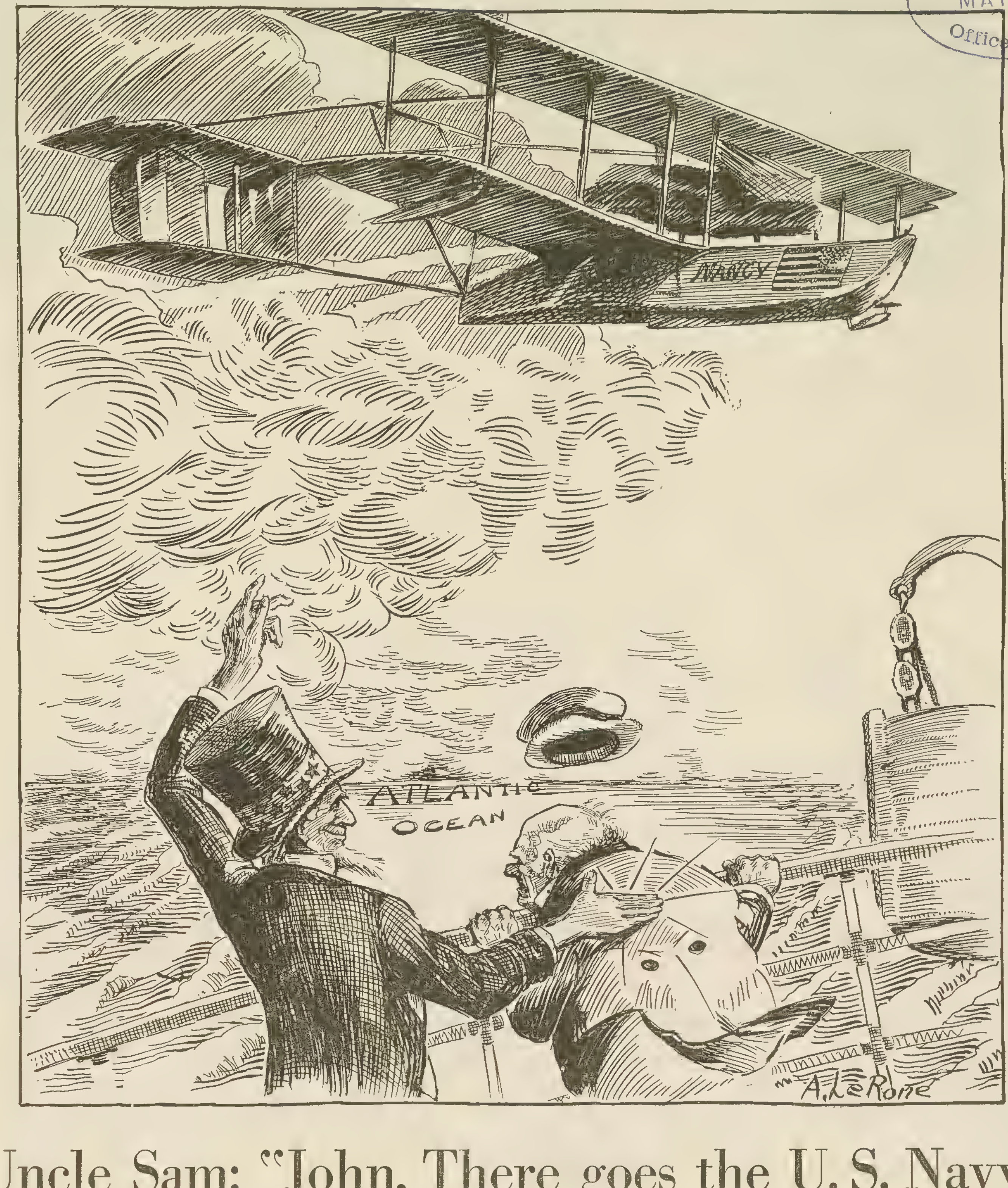
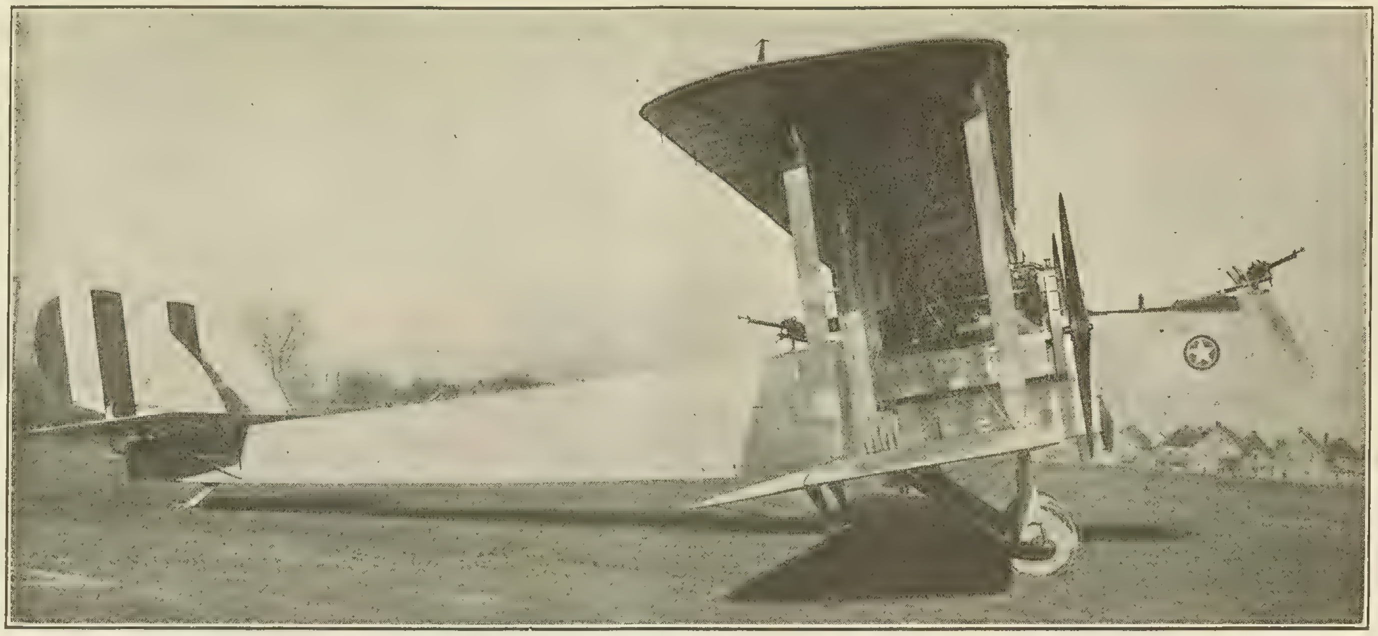


Uncle Sam: "John, There goes the U. S. Navy"



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THE MOST IMPORTANT AERIAL DEVELOPMENT OF THE WAR

Officially, it has surpassed the performance of every competitor.

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The skill and ability of the HOUSE OF MARTIN continue to maintain Supremacy of Performance and Dependability which they have held since 1909.

MARTIN U.S.A.

THE GLENN L. MARTIN COMPANY
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Contractors to the United States Government

Plans for Many Landing Fields

U. S. Government Will Aid Establishment of a System of National Air Lanes

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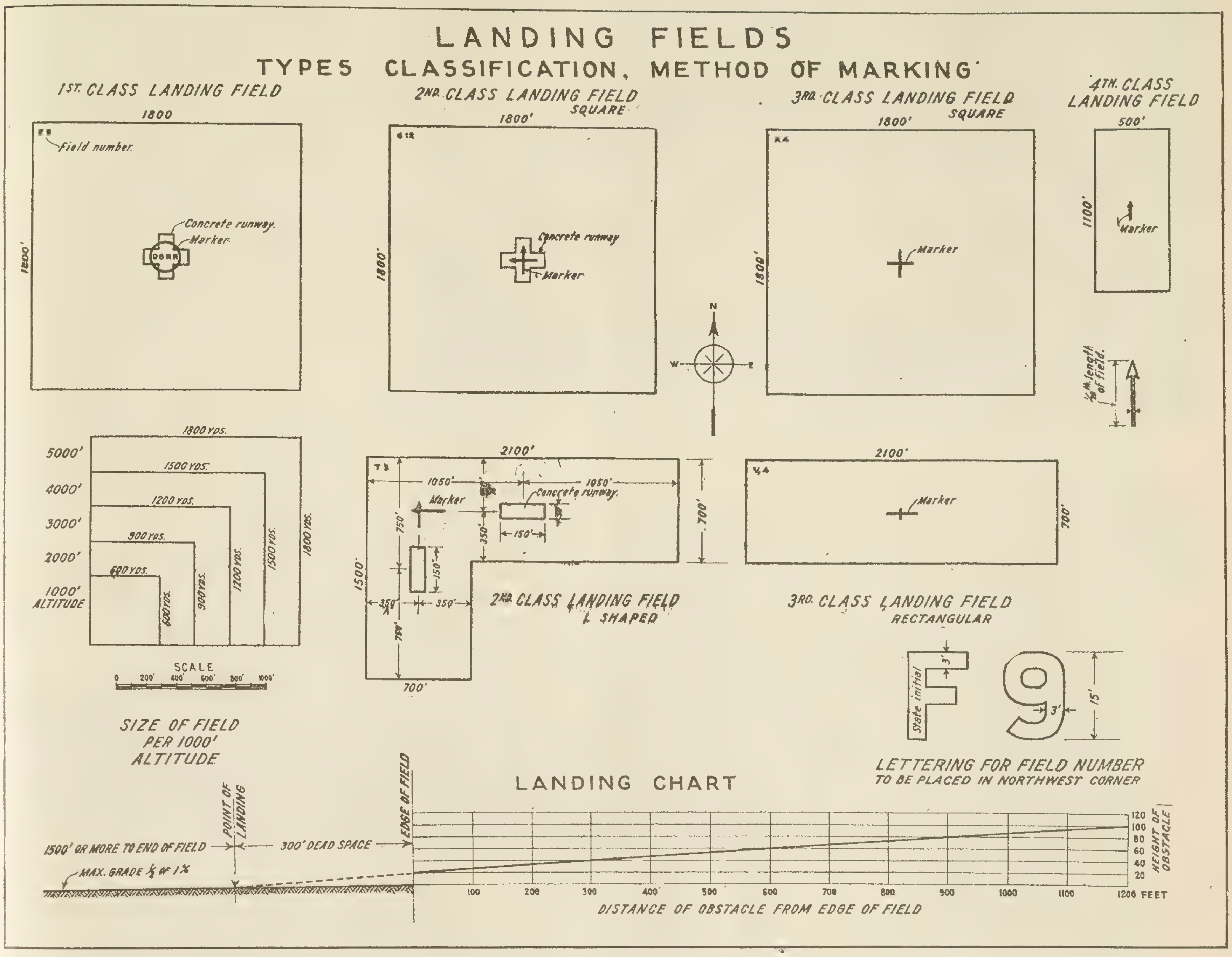
The Air Service of the United States Army announced at Macon, Ga., May 6, through the Southeastern Aeronautical Congress, the Government's official plan for co-operating with municipalities in the establishment of landing fields in all parts of the United States, thereby creating a system of aerial highways capable of use for military, postal, and commercial purposes.

Simultaneously with this announcement it was made known that the Air Service hopes within the near future to aid in the laying out of air terminals in at least thirty-two cities and towns from the Atlantic to the Pacific and from the Canadian border to the Gulf of Mexico. These points range in size from New York City to Flatonia, Tex., and have been selected for the position they must take in any organized national system of air lanes. They are as follows:

New York, Boston, Richmond, Va., Raleigh, N. C., Columbia, S. C., Augusta, Ga., Macon, Ga., Atlanta, Ga., Mobile, Ala., New Orleans, Baton Rouge, La., Beaumont, Flatonia, Texarkana, and El Paso, Tex., Columbus, N. M., Tucson, Phoenix and Yuma, Ariz., Bakersfield and Fresno, Cal., Buffalo, Albany and Syracuse, N. Y., Uniontown, Pa., Columbus, O., Kansas City, Mo., Oklahoma City, Oklahoma, Chicago, Daytona, Fla., Kissime, Fla., and Cleveland, O.



On these Diagrams the Important Points of the Government's Suggestions to the Southeastern Aeronautical Congress are Given

Four Classes of Fields

Landing fields are to be of four classes, according to the importance of the city or its position with regard to military, postal or commercial uses. No field should be proposed unless it is capable of expansion, for the Air Service is looking ahead to the day when aerial navigation will challenge the older means of transportation and it is insisted that municipalities give thought to the future.

The Air Service Announcement is in three parts: official policy, specifications for landing fields and classification of landing fields. In addition, there are blue prints illustrating exactly what a municipality, coming within a given class, should do. The announcement is declared to be the most important made since the actual establishment of an Air Service as it marks, it is pointed out, the adoption of a definite idea looking toward the development of aerial navigation in America along the unified lines of military, naval, postal and commercial activities.

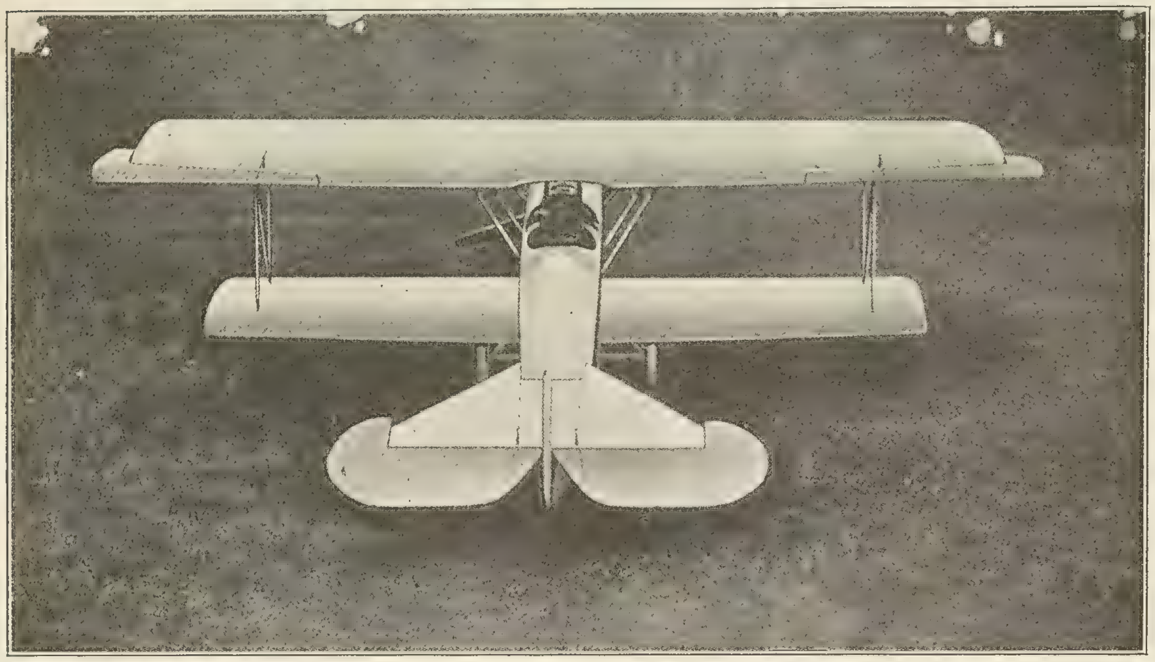
"The Air Service is now taking steps to seek the co-operation of certain municipalities in the United States for the purpose of establishing landing

(*Continued on page* 12)

The World's Airplanes and Seaplanes

In the series beginning with this week's issue of Aircraft Journal there will be described an airplane or a seaplane belonging to a certain group or type of machine, such as the sporting machine, the pursuit type, the large flying boat. There is no readier way of acquiring a reasoned familiarity with airplane construction and design than to make a comparative study of the various groups into which airplane construction is now fairly clearly divided.

The description of each machine will include photographs or line drawings, the main dimensions, weights and equipment. Details of construction will be included if of special interest. It is hoped that this series will be of value to all interested in aeronautics, as well as specialists in construction and design.



Rear View of the Fokker Single Seater Biplane D7

The grouping of types will be as follows:

Land Machines

1. Single Seater Pursuit Airplanes.
2. Two Seater Fighters.
3. Two Seater Reconnaissance and Day Bombers.
4. Three Seater Fighters.
5. Small Night Bombers.
6. Large Night Bombers.
7. Primary Training Machines.
10. Advanced Training Machines.
11. Small Sporting Machines.
12. Commercial Machines of the Mail Carrying and Transportation Types.

Water Machines

1. Sporting Machines, Flying Boats and Hydros.
2. Small Sea-Going Scouts.
3. Large Flying-Boats.

Each group will be introduced by a brief description of its particular functions and uses. The regularity of the grouping may sometimes be disturbed by the inclusion of a particularly interesting new machine—even if this does not belong to the particular type under consideration.

Group I—Single Seater Fighters

To this group belong those remarkable machines, whose superiority in the air meant so much to the contending forces. Their function was not to observe or report except in a very subsidiary degree. It was their business to protect the observation or bombing planes, and in so doing to destroy the enemy scouts. It was their business also to destroy the enemy observation and bombing planes. They required only a short radius of action, and so carried little fuel. Their power was continually increasing until 300 horse-power was usefully employed on a small one man machine. They were all well armed, with guns shooting forward in the line of the airplane's flight. Built for fighting they carried little equipment that was not absolutely necessary. The main qualities required were speed, climb, speed at heights, manoeuverability, vision. The commercial airplane virtues of slow and comfortable landings, or roomy and well equippel cockpits, of large useful load were not sought for.

Group IA—The Fokker Single Seater

One of the most interesting machines the war produced was the Fokker Biplane D-7. For a time it dominated the Allied forces in the air, and it was only at the very last that the Allied single-seaters equipped with the 300 horse-power Hispano reasserted their superiority. The Fokker achieved its wonderful manoeuverability and performance by skilful departure from standard practice in a marked degree, and not by using very high power.

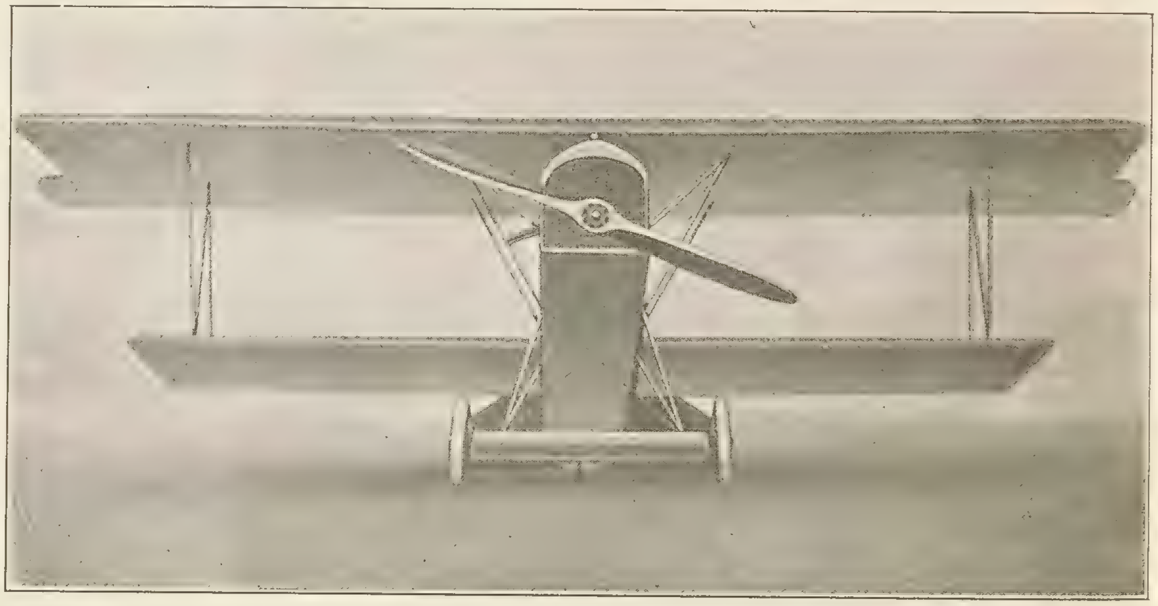
POWER PLANT

180 horse-power 6-cylinder Mercedes.
Main fuel tank, 13½ gallons. Reserve tank, 7¼ gallons.
Oil tank, 4½ gallons.
Air pressure for the tanks.

MAIN DIMENSIONS

Span, 29 ft. 3½ inches.
Chord upper wing, 5 ft. 2½ inches.
Chord lower wing, 3 ft. 11¼ inches.
Overall length, 22 ft. 11½ inches.
Gap, 4 ft. 2 inches.
Area of upper wing with ailerons, 140.7 sq. ft.
Area of lower wing, 78.3 sq. ft.
Area of ailerons, 11.4 sq. ft.
Area of balanced parts of ailerons, 5 sq. ft.
Area of horizontal tail plane, 21.1 sq. ft.
Area of elevators, 15.2 sq. ft.
Area of balance of elevators, 1.1 sq. ft.
Area of fin, 2.8 sq. ft.
Area of rudder, 5.9 sq. ft.

(*Continued on page 14*)



Front View of the Fokker Single Seater Biplane D7

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Unfavorable Winds Held up the NC Boats

All Three Were Ready to Start for Halifax on Schedule Time, Tuesday, May 6

If favoring winds prevail during the latter part of the week it is probable that the three NC boats will be in either Nova Scotia or New Foundland before this issue of AIRCRAFT JOURNAL reaches its readers.

All of them were in readiness for the initial step of the Atlantic ocean flight on schedule time last Tuesday morning—notwithstanding the fact that the wings of the NC-1 were badly burned in a fire which threatened more disastrous consequences had it not been promptly checked on Monday afternoon. The wind blew strong from the north, north-east all day Tuesday, however, and weather reports for Wednesday indicated heavy storms at sea, so Commander John H. Towers announced Tuesday night that no attempt at a start would be made before Thursday morning.

All of the ships then were in first class trim for the "Hop."

Neither of the English planes at New Foundland has attempted a start.

Official Description

The following description of the NC seaplanes is given out officially by the Navy Department:

Wing span from tip to tip, 126 feet.

Upper wing from tip to tip, 114 feet.

Aileron projections beyond wing tips, 6 feet on either side.

Lower wing span, 94 feet.

Width of wings, 12 feet.

Distance between wings, 14 feet at centre and 12 feet at outer tips of lower wing.

Over-all length from front end to the rear end, 68 feet 3½ inches.

Length of hull, 44 feet 9 inches.

Wing area, 2,380 square feet.

Weight of flying boat (empty), including wireless installation and all navigating instruments, 15,100 pounds.

Weight full load flying condition, 28,500 pounds.

Percentage of useful load to total load, that is, load not a portion of structure or equipment, 47 per cent.

Weight carried per square foot of wing surface, 12 pounds.

Estimated speed at full load, 79 nautical miles per hour.

Estimated speed at light load, 84 nautical miles per hour.

Horsepower of four Liberty engines, 1,600 horsepower.

Aviators' Electric Moccasins

Number of gasoline tanks, nine in hull, one in upper wing above boat hull.

Capacity of gasoline tanks, 200 gallons for each hull tank and 90 gallons for gravity feed tank in upper wing.

Weight of gasoline system, 6 pounds per gallon of gasoline.

Weight of engines, 825 pounds each.

Weight of boat hull (empty), 2,650 pounds.

Area of ailerons, 265 square feet.

Area of stabilizers, 267.6 square feet.

Area of elevators, 240.1 square feet.

Area of rudders, 69 square feet.

Displacement of wing tip pontoons, 1,800 pounds each.

Weight of wing tip pontoons, 95 pounds each.

Gasoline pumps are wind driven by small wooden propellers and are in duplicate; an auxiliary hand-operated gasoline pump is provided.

"Dep" Control

Flying control is of the dual control Deperdussin system with side-by-side seating.

Pilots are in hull just forward of gasoline tanks.

Complete sets of instruments provided for pilots, including one compass for each pilot.

Navigating station is in front end of boat hull. Navigator is provided with chart board, charts, and ordinary navigating instruments, including compass and sextant.

Complete wireless installation, including telegraph and telephone and wireless direction indicator, is provided. System should give a radius of approximately 300 miles while in the air and of 100 to 150 miles while on the water.

Electric current is furnished by electric generator operated by a wind-driven propellor. Current is delivered to storage batteries. In addition to operating wireless set, storage batteries operate complete lighting system for interior of boat and for wing tip and tail lights as well as lights for night landing.

Wireless operator and engineer are located in main after-compartment just aft of gasoline tanks. Each is provided with complete instrument board. Each of these operators has a cylindrical upholstered stool with back rest weighing 5 pounds complete, in the interior of which can be stored the small hand tools required for emergency work.

Cruising speed of boats, about 72 miles per hour.

Gasoline consumption at cruising speed, about 650 pounds average per hour.

Total gasoline carried, about 11,400 pounds.

Cruising radius without wind, about 1,476 nautical miles.

Lubricating oil capacity, about 900 pounds.

Crew of Five Men

Crew and provisions, about 1,000 pounds.

Crew, five men—two pilots, one navigator, one wireless operator, and one engineer.

Main structure is of Western spruce.

Metal wing fittings and structural fittings in general are of chrome vanadium steel of an ultimate strength of 150,000 pounds per square inch.

All flying and landing and control wires are of standard woven airplane cord wire.

Wing covering is linen treated with the ordinary airplane fabric dopes.

Gasoline tanks are of aluminum and gasoline piping is partly of aluminum and partly of copper.

Streamlining forms about wing struts are of Micarta. Streamlining of flying and landing wires is of rubber covered with rubberized fabric.

Main keels of boat hulls are of oak or of rock elm. Hull structure is in general of spruce. Planking is of spruce or of cedar. Turtle-back covering is of cedar or of cottonwood birch three-ply veneer.

Cowling around engine nacelles is aluminum.

Four liquid fire extinguishers are carried in each boat hull.

Access to any portion of the boat hull by means of wing passages or to any portion of the power plant by means of hatches in the boat hull may be had either while on the water or while in the air.

All control surfaces, such as ailerons, rudders, and elevators, are balanced by a portion of the area forward of the pivoting points in order to relieve the work of the pilots.

Aviator Suit Showing Connection Made by Edison Electric Appliance Co.

Heated Aviator Suits

The average person little realizes that on the hottest summer day the aviator in his aeroplane up 20,000 ft. in the air is encountering winter temperatures which vary from freezing to 15 deg. below zero. Added to these extreme temperatures is the breeze created by the speed of the plane, which makes a gale, or rather a hurricane, of 100 m,p.h.

Many persons have had the experience of riding in an automobile in cold weather at 30 m.p.h., and can realize how hard it is to keep warm even under such moderate conditions as compared to those which the aviator encounters. Even the Eskimo-like garments first provided for aviators failed to keep them warm under extreme conditions. And, of course, such garments should not be so bulky as to hamper the movements of the aviator. He must be free at all times to manipulate his machine.

Taking a suggestion from the well-known electric heating pad, electricity has been brought to the rescue by the Edison Electric Appliance Company of Chicago. Fortunately aeroplanes are provided with a low voltage source of electricity in the form of a little 12-volt generator propelled by the force of the air when the machine is in motion. And now electrically heated garments are available for the aviator.

It is only necessary to apply heat at the extremities of the body, so that only electrically heated moccasins, inner gloves and helmet linings are provided—all made of silk jersey. These are all electrically connected by means of little snap fasteners, like those used on ordinary gloves, with the main wiring inside of the body garment. The total wattage required to keep the aviator warm is only 82 watts. (The body garment, of course, is a heavy fur-lined garment.)

The moccasins, which are of double silk, are worn over the ordinary sock.

L. D. GARDNER. . .*President and Editor*
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AIRCRAFT JOURNAL

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Formerly Air Service Journal

Parachutes Coming

INTRODUCTION of the parachute as a required part of every aviator's equipment may have an effect on air tactics of the future. From the earliest days of naval engagements, ramming has been one of the most successful methods of attack. In a grave emergency, when any cost was not considered high for the accomplishment of a mission, warships of the largest type have been sacrificed in ramming the enemy.

With parachutes which will enable a pilot or crew to leave the battleplane in midair, the ramming of enemy airplanes can be considered as a probability. To prevent important information from reaching the enemy at a critical moment no price has been considered too great. Instances have been recorded of ramming during the war, but it has been difficult to determine definitely if accidental causes were not contributory. As ramming has up to the present time meant death, it was never considered but with the successful development of the parachute, this interesting development is believed certain to come into use.

Bright Aeronautic Future

THE aeronautical industry, which received such a curtailment due to the armistice and the natural cancellation of large war orders, is again beginning to see its way clear to lay plans for the future. The processes of liquidation of government business are slow and intricate. They are trying to all concerned and until settlements are made few companies have felt like announcing future plans.

By this time, however, the major adjustments have been completed and the War Department and Navy Department are considering the purchase of types of airplanes which are urgently needed to equip squadrons of various kinds. Constructors have been given information which has enabled them to proceed with the design of highly specialized machines which it is believed will put the American Air Service in advance of any air power in the world.

It is gratifying to American constructors who have been developing airplanes along new lines to learn that officers of the Air Service who have flown every type of machine overseas, regard the American airplane as better than any similar airplanes made abroad. In speed, it is well known that we are far in advance; in construction, the work is sound from the engineering standpoint; in performance other than speed they excel in their class. This is not fulsome praise or conceited bragging, but the reflection of the opinions so frequently heard from officers who have flown and tested the new American aviation factory products.

Strength in Chassis Design

IN the early days of airplane design, the chassis was subject to numberless variations. Two wheels and a center skid, two wheels and a small wheel ahead, two wheels with a skid apiece were used. At the present moment for small and medium size machines, the chassis employed is almost always of the two-wheel, four-strut type and fundamental variations are few. It would seem as if this were a correct survival and that no modifications need seriously be sought.

The landing gear has also grown in simplicity, and its fairing is now remarkably good. There is one direction, however, in which much work remains to be done, namely, a logical basis for the strength design of the chassis. It is quite true that a great many chassis have been produced which have stood up well in service, but there is no agreement as to the criterion on which strength design should be based. Not only may landings vary in intensity, but also in character. Thus a three-point landing with skid hitting the ground simultaneously with the wheels may induce very high stress in the front strut with very little load on the rear one. A head-on landing where the pilot has not had the proper time to flatten out may produce more stress in the rear strut. A side-swipe brings a large transverse force to bear, which a gear with struts strong enough to bear any vertical loads may not be able to resist.

Designers are not only in doubt as to the intensity of landing shocks, but they are also in doubt as to their character, and observation in the field is as a rule difficult. It is hoped that appreciating the importance of this problem, pilots will mentally classify, and judge quantitatively, the probable loads on landing. Rough impressions, provided they be sincere, will be of great value to designers and constructors alike.

German Advantage in the Air

THE secret of the German effort lay, without question, in the superiority of the scout planes, and the effort dates from the appearance of the Fokker Biplane (D7), about the middle of June. Two months later the air was full of Fokkers, a record production! Designed on unique principles and using a high power motor, the new scout rapidly demonstrated remarkable qualities. Its unequaled climb, good speed and wonderful dive and zoom soon marked it as the best scout on the front. The (SE5) and Clerget and Rhone Camel were outclassed; the Bentley Camel and 28 Nieuport were met with a very worthy opponent and the Spad was obsolete. From Zeebrugge to Toul the pursuit squadrons patroled the skies in Fokkers and there followed a period of most intense aerial combats and "dog-fights" along the whole western front. The secret of the Hun effort was the Fokker Biplane.

But the supremacy of any plane is short. In the middle of October a new and higher powered Fokker was met on the British front by the Snipe, the new Sopwith scout, which proved superior to all single-seaters on the front. The Huns, in turn, produced the Schuckert and the new Pfalz, just appearing at the end of the war and which, though untested in extensive combat, promised to surpass the Snipe. The Roya Air Force still maintained superiority in the north. If the French had new planes, they had put none on the front. And the SE5 and Spad were clearly out-classed by the new German planes. Here the advantage in planes lay with the Huns.—*Plane News, A. E. F.*

Thou, Too, Sail On, O, Ship of Air

EVERY American heart will beat faster while our intrepid naval aviators are endeavoring to fly the NC-1, 3 and 4 across the Atlantic ocean. Months of hard work have been devoted to the arrangement of the flight, and it is believed that no detail which could aid in the success of the attempt has been omitted. Nevertheless it is a plunge into unknown elements and conditions, and is surrounded by more than the usual glamour which accompanies valiant men on hazardous expeditions of discovery. Should the trip be accomplished it will transcend in importance to civilization any achievement in modern times. It will mean the reduction of years to months, months to weeks and weeks to days. If time is money its intrinsic value will, indeed, be inestimable, because it will open the way to the permanent development of oceanic aviation. "Thou, too, Sail On, O Ship of Air, " to paraphrase Longfellow.

Necessity for Instruments In Commercial Flying

Airspeed, Course and Distance Indicators, Oxygen Regulator, Compass, Directional Stabilizer, Altimeter and Many Other Devices

By Charles H. Colvin, M. E.

The successful navigation of the air depends today much more upon the use of proper instruments than upon any other factor. Many good modern planes can be depended upon to fly regularly and steadily for a given period. But to be useful commercially the pilot must be able to know at all times where he is going and to be certain of reaching a given destination promptly.

This cannot be done without reliable instruments of navigation and the sooner the need of such apparatus is appreciated and the requirements of such instruments are understood, the sooner we shall see commercial aviation an unqualified success. This article describes briefly the various types of instruments, and their purpose and use.

Aircraft instruments may be divided into two classes. First, those which have to do with the power plant, and are largely adopted, or adapted, from automobile practice; and second those instruments which were developed to meet the new conditions encountered in the navigation of the air.

The first class of instruments includes the switches, tachometer, oil gauge, air gauge, gasoline gauge and radiator thermometer. Most of these instruments are too well known to require much description. The switches are used for controlling the ignition, lights, etc. The tachometer, similar in construction to an automobile speedometer, indicates the speed of the engine. As the lifting power of an airplane depends upon the power and hence upon the speed of the engine, the tachometer is a very important instrument. A number of different types are used, some operating on the magnetic principle, some centrifugal, and some chronometric, or "time-counting."

Oil gauges and air gauges are generally of the familiar bourdon-tube type, and are similar to countless others in various commercial uses. The gasoline gauge on an airplane is of tremendously greater importance than on an automobile. With a car, one can pull up beside the road and look in the tank, but in an airplane it is sometimes of vital importance to know how much gas is left, and the gauge must be depended upon for this information.

Gasoline gauges are of two general types: tank gauges, and remote or instrument board gauges. The tank gauges usually embody some form of twisted strip or eccentric rod carrying a float, the vertical motion of the float revolving the strip or rod, the upper end of which is connected to the gauge mechanism. In one type a magnetic connection is made to the hand of the gauge. These gauges have the disadvantage that they are only useful if the top of the tank is visible from the pilot's seat. Instrument board gauges have not, however, been very successful, as the difficulty of transmitting motion to the instrument board has involved the use of complicated and more or less unreliable mechanisms.

The radiator thermometer has been improved for airplane use by transferring the indicator to the instrument board. A small "bottle" is placed in the radiator, connected by a tube to the indicator, which is a gauge actuated by the changing pressures caused by the changing temperatures in the radiator.

Among the instruments which were created specially for aircraft work are: the air speed indicator, air distance recorder, altimeter, compass, drift indicator, turn indicator, course and distance indicator, banking indicator, clinometer, incidence indicator, oxygen regulator, ignition interrupter, servo motor, directional stabilizer, and automatic pilot.

Some Peculiarities of Flying

Before considering this class of instruments we should take time to review some of the peculiarities of flying which are not always well understood.

Airplane Camera

In the first place we must remember that once off the ground we are not related or connected to it in any way, except that gravity attempts to pull us toward it, and that we can see it below us. In addition to gravity there are other forces acting on an airplane (centrifugal force and acceleration forces) which are precisely like gravity except that they act in different directions and with different intensities. As these forces, added to gravity, give us an apparent gravity in other directions than downward, we cannot rely on the forces which we feel to indicate the vertical.

Our only connection with the earth then is our vision, and if this be destroyed by fog, clouds, or darkness, our connection is completely severed, and we must rely upon instruments to tell us where we are going and how our machine is performing. This lack of connection with the earth must always be kept in mind.

Aircraft Compass

Probably the first instrument to be used was a combination banking indicator and incidence indicator, which some pilots used on the old Wright machines. It consisted of a small piece of cloth tied to one of the forward out-riggers. If it blew back approximately level it indicated a small angle of incidence; if it blew up at an angle, a large angle of incidence. If it blew to one side or the other it showed a slip or skip, or an incorrect bank. This simple device served very well on the old pusher-type machines, but of course cannot be employed on a modern tractor plane.

The Banking Indicator as now used is an instrument using a pendulum of some form to show the direction of gravity or apparent gravity. As it is necessary to keep the wings at right angles to the resultant force on the machine, whether it be gravity or a combination of gravity and centrifugal force, a banking indicator does not operate in reference to the ground, but in reference to the resultant gravity and other forces. The most satisfactory form uses a small pendulum which is "damped" so that it will not oscillate under vibration, but which is sensitive to small angular movements of the plane.

One of the factors affecting the lifting capacity of a plane is the angle of incidence of its wings. The Incidence Indicator is used to measure this angle while in flight, so that the machine may be pulled up to a large angle for the best climb, or flattened out to the smallest possible angle for the maximum speed. As similar information about the performance can be obtained from the Air Speed Indicator, the Incidence Indicator has not been largely used.

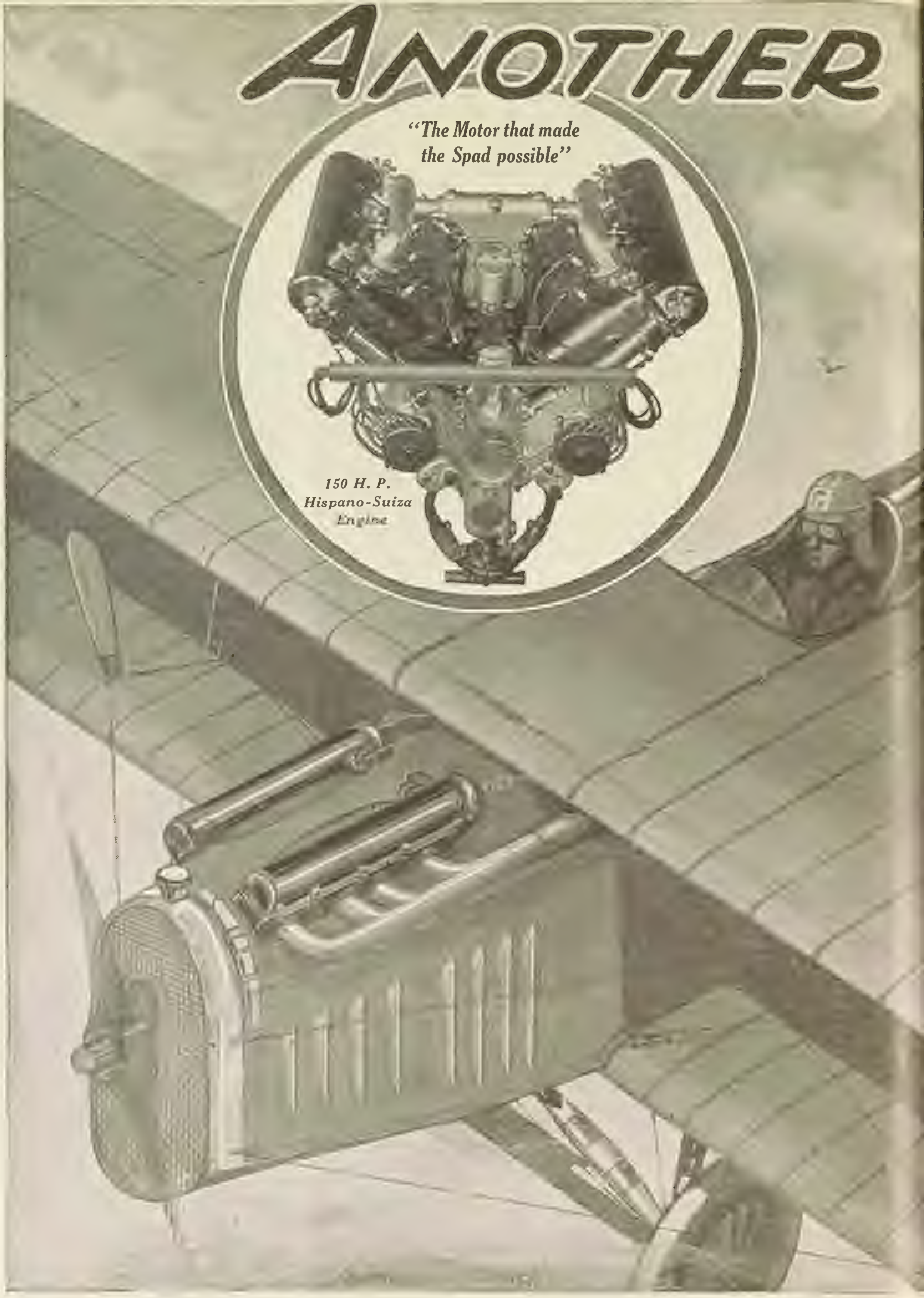
Air Speed

The Air Speed Indicator corresponds in a way to the speedometer of an automobile, but it shows speed relative to the air without regard to the speed relative to the ground. As the lifting capacity of a plane depends upon its air speed, this instrument is extremely valuable to the pilot. It is a pressure gauge, and indicates speed because the speed with which an airplane goes through the air is proportional to the pressure of the air against the machine. This pressure is measured by mounting a tube with its end open to the air, and as the plane rushes forward the air presses into this tube and operates the gauge. As a navigating instrument the Air Speed Indicator is not of great value, as its readings depend upon the altitude, the error being over fifty per cent at twenty thousand feet.

A recent development is the Air Distance Recorder. This corresponds to the odometer used on automobiles, except that it shows the number of miles travelled through the air. A small windmill is mounted on the airplane where it can revolve freely as the plane goes forward. Its revolutions are therefore proportional to the air distance which the machine travels, and indications are given to a counter on the instrument board which records the distance in miles. This instrument has the advantage over an Air Speed Indicator that its readings are correct at any altitude.

The Altimeter is an aneroid barometer, or absolute pressure indicator, which has been

(*Continued on page* 11)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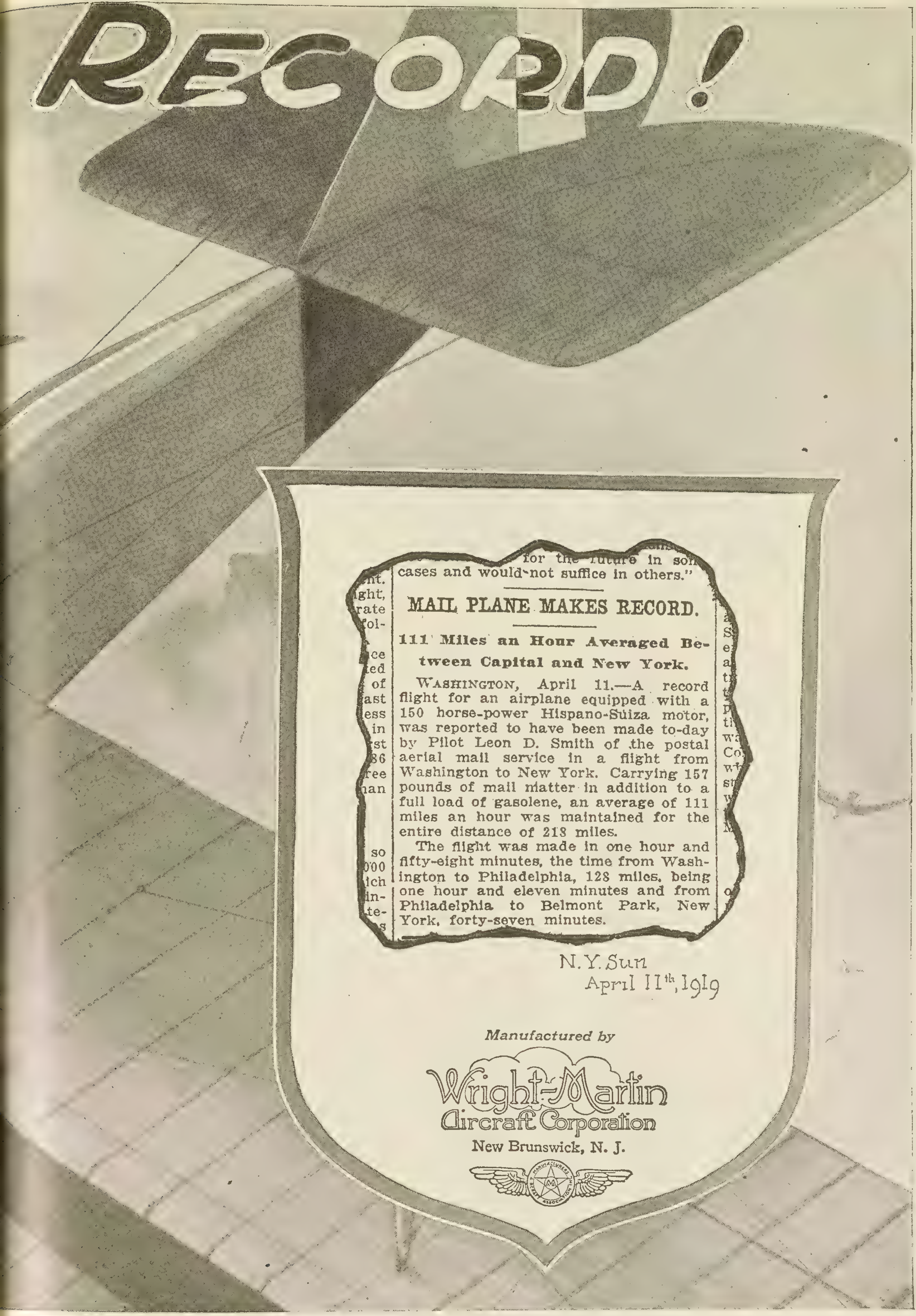
"The Motor that made the Spad possible"
150 H. P. Hispano-Suiza Engine



for the future in som cases and would not suffice in others."

MAIL PLANE MAKES RECORD.

111 Miles an Hour Averaged Between Capital and New York.

WASHINGTON, April 11.—A record flight for an airplane equipped with a 150 horse-power Hispano-Suiza motor, was reported to have been made to-day by Pilot Leon D. Smith of the postal aerial mail service in a flight from Washington to New York. Carrying 157 pounds of mail matter in addition to a full load of gasolene, an average of 111 miles an hour was maintained for the entire distance of 218 miles.

The flight was made in one hour and fifty-eight minutes, the time from Washington to Philadelphia, 128 miles, being one hour and eleven minutes and from Philadelphia to Belmont Park, New York, forty-seven minutes.

N. Y. Sun
April 11th, 1919

Manufactured by

Wright-Martin
Aircraft Corporation
New Brunswick, N. J.

News of the Army and Navy Air Services

Orientator Demonstrated

The operations of the Ruggles Orientator used by the Army Air Service for instructing fliers was demonstrated recently at the Air Service building in Washington. Major Gen. Charles T. Menoher, Brig. Gen. Wm. Mitchell, Col. M. F. Davis, Col. T. De W. Milling, Col. George H. Crabtree and other officers of the Air Service were present.

The machine was demonstrated by W. G. Ruggles, the inventor, and Major F. J. Martell. General Mitchell and Col. Davis also had rides.

The Ruggles Orientator is a mechanism which enables the operator to revolve a section of an airplane fuselage about three different axes. This machine, resembling somewhat a giant gyroscopic top, is used to train a flier or pupil in orientation and motion sensing. Two sets of large steel rings are swung, one in vertical and one in horizontal bearings and driven by small motors so that they revolve within each other. The longitudinal axis of the airplane fuselage is suspended by bearings on the innermost ring and also revolved by motors. Dual sets of controls, one in the machine and one on the floor, permit the instructor or the student to regulate the evolutions of this machine in any of three directions, both forward and reverse. Either the student or the instructor can cause the car to revolve in one, two, or three directions at once, but with experience the student is enabled to control the mechanism and keep himself upright despite the efforts of the instructor to unbalance him.

Feeling the necessity of teaching all fliers stunts or aerial spins, the officers of the Air Service Medical got Wm. G. Ruggles to further develop an invention which he had evolved in 1912. This machine enabled the flight surgeons to give the flier the sensations of aerial spins while he was safe on the ground. The Ruggle's Orientator was produced, and was shown for the first time to the public at the Aeronautical Exposition in New York. With this machine the Army surgeons, who have in mind the care of the flier, teach an aviator or a student the proper senses of orientation and enable him to learn stunts and the controls before he tries them aloft in a plane endangering his life and running a chance of wrecking a valuable plane.

By manipulating the controls, which are almost exactly the same as those of an airplane, the operator whirls the car through its various spins much faster than any airplane can turn. A slight movement of the stick, which projects upward between the pilot's knees, to the right causes the car to tip to the right on its horizontal axis, just as an airplane would if he banked.

If the pilot holds his stick to the right the car turns over and will continue to roll on its longitudinal axis until the stick is brought back to neutral. If this motion is started by the instructor, it may be counteracted by the student with a movement of his control stick to the left, or, vice versa. If the instructor pushes his control stick forward the car in the orientator begins to fall, or rather to turn with its nose down just as an airplane would start in a nose dive; this motion, is of course, overcome by the student before a revolution is made, by bringing his control stick slightly toward him. But, if it is not controlled, the car will spin around its lateral axes performing a sort of impossible reverse loop.

Of course, the radius of the circles which the operator passes through in this training machine, are very much shorter than they would be in an airplane performing similar stunts, and the speed is much faster, so that the student is subjected not only to the principal rotations but experiences much worse spinning sensations than he would in any plane.

Finding himself upside down in the orientator, he can do one of two things; throw his stick forward as in nosing down in a plane, and thus turn over, or, in this machine, he may throw his stick to the right or left to turn over, which, of course, he probably could not do in an airplane unless he had great speed.

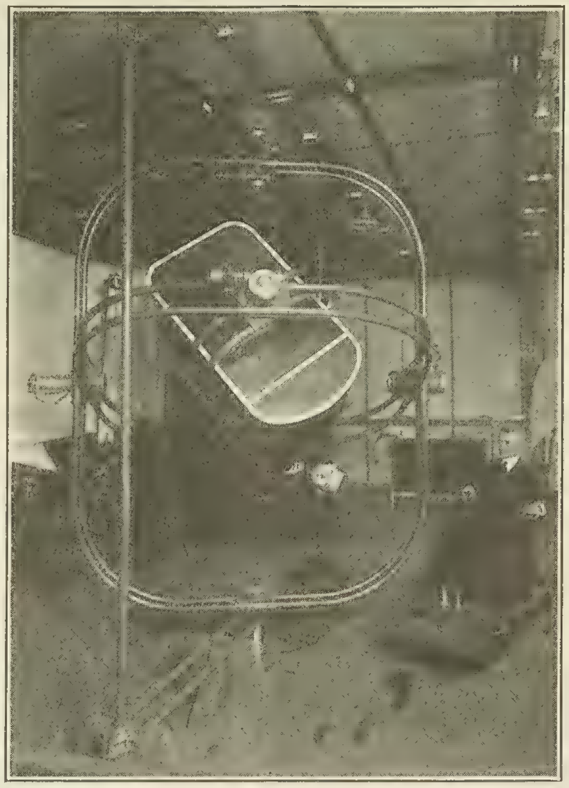


Photo by Photograph Section, Air Service

Demonstration of Ruggles Orientator

The third direction of rotation is from right or left around a vertical axis, and this is controlled, as in a plane, by the rudder bar. A pressure with the left foot causes the machine to turn in that direction, and a pressure of the right foot counteracts this, or causes it to revolve to the right.

The student is first permitted to experiment with these controls himself, but after he has mastered them he is put through rather complicated paces by the instructor and expected to be able to maintain himself upright and on an even keel, or to be able to return immediately to normal position. The ability to realize one's position in space, as it were, and maintain the normal is known as orientation, a faculty which every flier must develop to successfully perform stunts.

Stunts have been found very necessary in flying, especially war flying. Sometimes an aviator falls unintentionally into an unusual position; a spin, upside-down, etc., and he must know it at once and be able to extricate his plane and gain a normal flying position.

Practice on the orientator teaches the pilot to sense and realize his position almost immediately through the functioning of his center of equilibrium within his inner ear. This "ear motion sense," as it is called, is very keen when developed and affords a pilot an additional method of orientating himself when his muscle sense and eyesight fail to do so.

In other words, a man trained by this method should be able to know his position immediately, even if his muscles failed to function and he was in the dark.

Rides for Enlisted Men

The Flying Department at Kelly Field has made arrangements to give enlisted men a ride when they are about to be discharged, and it is with keenest interest that they come into the office and arrange for their flights.

Airplane vs. Train

Kelly Field has again illustrated the necessity of the airplane as a commercial factor.

The Mexican Trades Delegation, composed mostly of Texas business men, making a tour of Mexico for the purpose of encouraging and arranging for trade relations, had assembled in San Antonio under the direction of the Chamber of Commerce. All arrangements had been completed late Friday night and the party had boarded the Special train, on the I. & G. N. R. R., which was to take them on their pilgrimage, when it was discovered that nine of the passports had not arrived. Telegraphic permission was secured immediately, pending receipt of the passports, and the train started for the border.

Saturday morning the Secretary of the Chamber of Commerce called up the field explaining the situation and stating that the passports had been received from the State Department, in Washington, and asking if it would be possible to dispatch a courier by airplane, with the missing documents.

Colonel Fechet, Commanding Officer of Kelly Field, immediately responded and at two o'clock Lieutenant H. S. Kenyon, accompanied by a mechanic, left by plane for Laredo. Owing to heavy low clouds, and to the smallness of the landing field at Laredo, Lieutenant Kenyon was forced to use a Curtiss JN-4 Canadian, equipped with a four-hour tank, in the face of a twenty-mile wind. The 150-mile trip was made in remarkably good time, three hours and twenty minutes. The passports were delivered to the Custom Officer and the Trade Delegation was free of all encumberance.

The return trip was completed in two hours and twenty minutes, Lieutenant Kenyon flying at a higher altitude and taking advantage of a thirty-five-mile wind.

Reserve M.A.'s

The following-named Officers, having completed the required tests, are rated as Reserve Military Aviators, to be effective from the dates set after their respective names: Capt. Lloyd T. Jones, A. S. A., April 3, 1919; Capt. James A. Langston, A. S. A., April 3, 1919; and First Lieut. Hiram E. Wilson, A. S. A., April 3, 1919.

Personal

First Lieut. William H. Cosgrove, Ordnance, has been ordered to proceed from Washington, D. C., to Aberdeen Proving Grounds, Aberdeen, Md., on temporary duty, for the purpose of witnessing and firing of Baldwin Gun with reference to its adaptation for aerial use.

Major Warren P. Jernigan, Junior Military Aviator, Air Service Aeronautics has been ordered to Eberts Field, Lonoke, Arkansas; thence to Barron Field, Everman, Texas; Love Field, Dallas, Texas; Kelly Field, San Antonio, Texas; thence to Ellington Field, Houston, Texas; and Park Field, Millington, Tennessee, on temporary duty for the purpose of conference with Field Commanders regarding flying training.

Col. Chalmers G. Hall, A. S. A., has been ordered to proceed from Washington, D. C., to Hazelhurst Field, Mineola, Long Island for the purpose of inspection of Engine Plant at Wright-Martin Aircraft Corporation.

Lieut. Floyd A. Wilson, R. M. A., has succeeded Capt. Chas. J. Glidden as personnel adjutant at Souther Field, Ga.

Lieut. Herbert Blakeslee, engineering officer at Souther Field, has gone to Atlanta to assist in the laying out of the Candler Flying field.

Instruments In Commercial Flying

(*Continued from page 7*)

altered to read in thousands of feet of altitude instead of inches of mercury. The zero is made adjustable so that when starting from any altitude other than sea-level, or when the barometer is higher or lower than normal, the scale can be moved so that the instrument indicates altitude above the starting point.

The Need of the Compass

Compasses have of course long been used in ships, but their adaptation to aircraft has involved problems much greater than the design of many new instruments. The compass consists principally of a metal or glass bowl, which contains a float carrying the magnets and card. It is filled with liquid to damp the oscillations of the float, and to remove most of the weight from the pivot. The compass is one of the most necessary and useful of all aircraft instruments.

Although a pilot knows from his compass the direction he is heading, he cannot tell from that instrument the course he is actually travelling over the ground, as a wind at an angle with his heading may be blowing him sideways. The difference between the heading and the course is called the "drift," and when the ground or sea is visible may be determined by means of a Drift Indicator. This is an instrument which has been made in several different forms. In one type the ground is viewed through parallel wires and the instrument turned until objects on the earth appear to travel along the wires. The angle through which the indicator has been turned is the drift, and if added to, or subtracted from the compass reading will give the course. In the Sperry Synchronized Drift Set this is done automatically by connecting the drift indicator to the lubber-line of the compass.

As an auxiliary to the compass, for flying in clouds, fog, or darkness, the Turn Indicator is used. When flying "blind," a pilot is almost certain to start to turn, just as a man in the woods will walk in circles. Once started on such a turn it is exceedingly difficult to straighten out, and the results have not infrequently been disastrous. The compass cannot be depended upon to avoid such turns, as its tendency to oscillate makes it unreliable except when an approximately straight course can be followed by eye or by other means. Here a Turn Indicator is very useful as it shows the slightest divergence from straight flight. It is a gyroscopic instrument, which is extremely sensitive to motion about a vertical axis, but unresponsive to motion about any other axis.

A Clinometer is an instrument for indicating the attitude of an airplane in reference to the horizontal. For the longitudinal position of the machine this has been done by using a slightly pendulous wheel, damped in liquid. Its action is not satisfactory, however, under all conditions. A variety of spirit level is also used, but without thoroughly satisfactory results. For indicating the lateral position of the plane, no instrument has been found really useful except the gyroscopic clinometer. This shows the attitude of the machine both laterally and longitudinally. Being rather complicated and expensive it has not been employed to any great extent. With the development of the turn indicator, and of a sensitive banking indicator, the need for a clinometer is practically removed except for bombing and photographic work.

The Course and Distance Indicator is a small chart, somewhat like a range-finder, on which can be laid out the speed and direction of the plane, and the speed and direction of the wind, and from which can be found the proper heading for the desired course, and also the air distance which must be travelled to reach the desired destination.

The Oxygen Regulator was a war-time development for automatically controlling the supply of oxygen to the aviator at high altitudes.

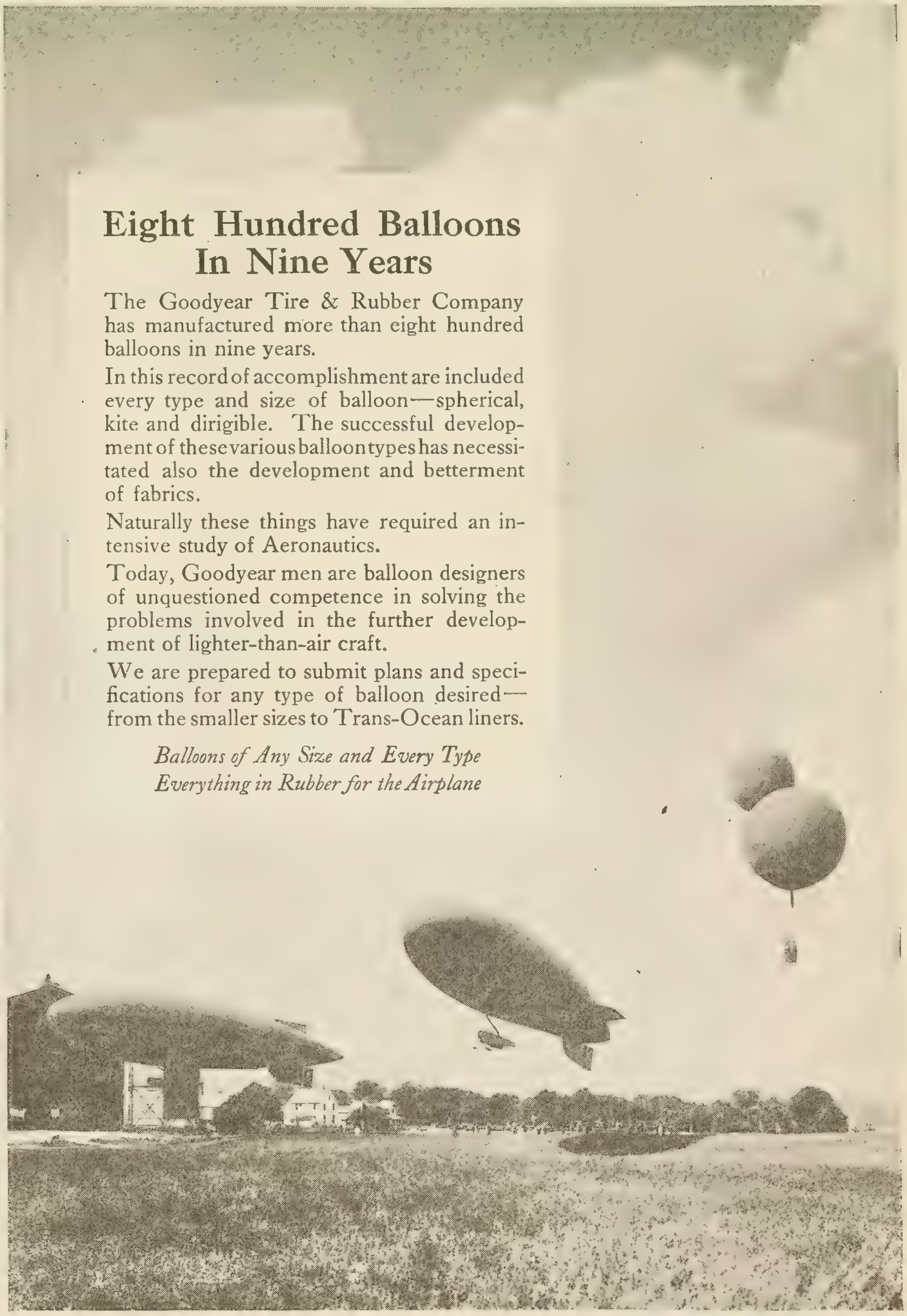
A power plant attachment which was developed specially for aircraft work is the Ignition Interrupter. This instrument consists essentially of a pendulum so constructed and adjusted that in case of damage to the propeller causing excessive vibration, it swings violently and trips a switch which interrupts the ignition and stops the engine.

Automatic Control

An apparatus which has not been largely used but which appears to have a considerable future is the Directional Stabilizer. A gyroscopic device which can be depended upon to hold a given direction, is used to give indications to a servo motor which operates the rudder. A plane so equipped will fly on a straight course for an indefinite length of time with practically no attention to the rudder.

In this discussion of aircraft instruments, reference has only been made to the airplane. Most of the instruments described are also used on dirigible balloons, and this type of aircraft requires many special instruments which have not been described.

As the importance of small things is always apt to be underestimated, so aircraft instruments have not received the consideration which they deserve. It must be remembered, however, that the essential difference between an airplane which can only demonstrate its capabilities at a flying field, and one which can make practical commercial journeys, is a matter of reliable instruments. The sooner that due attention is accorded them the sooner will the flying of aircraft cease to be only a sport and begin to become an industry.



Eight Hundred Balloons In Nine Years

The Goodyear Tire & Rubber Company has manufactured more than eight hundred balloons in nine years.

In this record of accomplishment are included every type and size of balloon—spherical, kite and dirigible. The successful development of these various balloon types has necessitated also the development and betterment of fabrics.

Naturally these things have required an intensive study of Aeronautics.

Today, Goodyear men are balloon designers of unquestioned competence in solving the problems involved in the further development of lighter-than-air craft.

We are prepared to submit plans and specifications for any type of balloon desired—from the smaller sizes to Trans-Ocean liners.

Balloons of Any Size and Every Type
Everything in Rubber for the Airplane

GOODYEAR
AKRON

Plans for Many Landing Fields

(*Continued from page* 3)

fields, particularly for the use of the Air Service and the Aerial Mail, said fields to be placed at the disposal of such other fliers as may be determined upon through mutual agreement," reads the official announcement.

The Air Service and Post Office Department have prepared a form of agreement between the United States government on the one hand and the municipality on the other.

To the cities enumerated, as well as to all others interested, including the three score represented at the Southeastern Aeronautical Congress, the Air Service has sent landing field specifications advising that special attention should first be given to the following points:

1. That the position of the field bear some reference to the main aerial routes.
2. That it is unlikely to be shut in by future building operations.
3. That it is capable of expansion.
4. That it is situated close to transportation facilities and water supply, but not necessarily within the city limits.

The minimum size of any municipal landing field must be such as to allow a 600 yard runway in every direction with no obstacles.

The best shape for a field would be a square or a rectangle, but this is not absolutely essential. An "L" shaped field will suffice, provided each arm of the "L" is at least 300 yards wide and 600 yards long. The area of landing grounds on this basis will average sixty acres.

The ground should be firm under all weather conditions. A light porous soil with natural drainage is recommended as the most suitable, covered with close cropped grass. Fields with clay soil invariably demand special drainage and are unsatisfactory as a rule in wet weather. A concrete cross, 150 feet by fifty feet on each side provides an excellent wet weather take off and landing spot. Tan bark or firm soil would suffice. The surface should be level and smooth so that ships could normally land upon and taxi across without injury.

All landing fields should be free from surrounding obstacles, such as high buildings, high-tension power lines, trees, etc. The country immediately surrounding the landing field should afford facilities for forced landing in event of engine failure while taking off.

A white circle, 100 feet in diameter with a band three feet wide, has proven by experience to be an excellent distinctive marking for a landing field. This can be seen at almost any attainable height with clear visability. It is necessary to keep the marking clear white to make it show up well. This can be done by whitewashing from time to time. The name of the station should be marked in chalk letters fifteen feet long by three feet wide. A wind indicator, such as the standard aviation wind cone, should be placed at one corner of the field, thirty feet off the ground.

The accommodations at these fields should provide communication by telephone, transportation facilities, gasoline, oil and sundry supplies.

In the selection of these fields it is imperative that future expansion be considered, as the tendency is to build larger and larger airplanes, with many motors, and these require extensive areas upon which to land.

Having in mind both the needs of the Army and the Post Office Department, as well as the capabilities of individual cities and towns and their relation to commercial routes, the Air Service has divided landing fields into four classes. All classes must conform to the general specifications as to the character of the ground, etc., but the first class field in addition to its gigantic markings, must provide the following accommodations:

(a) Hangar space, wind indicator, tools and other repair equipment.
(b) Supplies, gasoline, oil, water and sundry spares.
(c) Telephone communications.
(d) Transportation facilities.
(e) Attendants.
(f) Proper guard and enforcement of field regulations.

A second class field marking shall be a cross arrow with bars three feet wide and the length shall be determined by the size of the field. Each bar shall be ninety feet long, provided the field allows 600 yard runway. Proportionate length or one to twenty if under or above that. In the case of "L" shaped fields, the bars shall cross each other proportionate to each arm of the "L." The cross shall be placed so that each arm indicates the center of the runway, while the arrow heads point North and West. The number of the station shall be in figures fifteen feet long by three feet wide, and as in the case of the first class field, placed in the northwest corner. Accommodations differ in that attendants and guard shall be available only upon request. But there shall be enforcement of field regulations.

A third class field is generally similar to the second class except:

(a) Supplies available upon request.
(b) Near city or town with available help upon request.
(c) Field regulations with available guard.
(d) Provision for informing pilots of available accommodations.

A fourth class field is for use only in an emergency. It shall be marked with a single arrow indicating the best approach and the longest runway. The arrow shall be three feet wide and its length shall be based upon the proportion of one to twenty or ninety feet for 600 yard of runway.

All cities interested are directed to apply to the War Department Office of the Director of Air Service, Training and Operations Group, Training Division.

"THE SHARK," FIGHTING BOMBER

L-W-F ENGINEERING COMPANY, Inc.

COLLEGE POINT, L. I.

FOR SALE

AIRPLANES

Royal Flying Corps Canadian Training Planes, equipped with Curtiss 90 H. P. OX 5 engines. First-class flying condition. Immediate delivery. **$2,000.00** each. Complete supply service.

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Now open for enrollment of students

Essington Aviation School

Tuition given by instructors of long experience in civilian and army flying. Complete course $400.

The Essington Aviation School has the best facilities for water flying in the country, located just outside of Philadelphia, known as Chandler Field.

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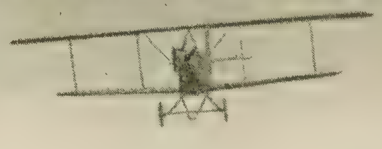
Essington Aviation School Essington, Pa.

THE ACE



AMERICA'S FIRST AFTER-THE-WAR AIRPLANE DESIGNED ESSENTIALLY FOR CIVILIAN USE

QUICK climb, slow landing speed (25 miles), and moderate price—these are some of the reasons why Eddie Stinson has selected and bought an Ace for personal use. A one-man ship that flies like a scout, not like a training plane—safe and handy in restricted areas such as small fields, golf courses, bathing beaches. Guaranteed. Quick replacements of all parts from motor to tail skid.

Send for circular.

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THE AEROMARINE PLANE AND MOTOR COMPANY

Will Specialize in Filling the Individual Requirements of

THE UNITED STATES ARMY AND NAVY

—and—

PRIVATE INDIVIDUALS

Aeromarine Plane & Motor Company

Factory—Keyport, N. J. New York Office—Times Bldg.

Member Manufacturers' Aircraft Association

The World's Airplanes

(Continued from page 4)

MAIN WEIGHTS

Weight of fuselage, complete with engine, etc.	1,322.2 lbs.
Weight of upper wing, with ailerons	167.2 lbs.
Weight of lower wing	99.0 lbs.
Weight of fin and rudder	6.6 lbs.
Weight of fixed tail plane	17.6 lbs.
Weight of elevators	9.9 lbs.
Total, empty	1,622.5 lbs.
Useful load, about	395.0 lbs.

PERFORMANCE

Altitude in feet	*Climb to altitude*	*Speed at altitude*
3,281 feet	4 min. 15 sec.	116.6 m.p.h.
6,562 feet	8 min. 18 sec.	114.1 m.p.h.
9,843 feet	13 min. 18 sec.	109.7 m.p.h.
13,124 feet	22 min. 48 sec.	103.5 m.p.h.
16,405 feet	38 min. 5 sec.	94.9 m.p.h.

STRUCTURAL FEATURES

The most interesting structural feature about the Fokker is the use of a very deep wing section, which permits the elimination of the interplane cables, only struts being used between the upper and lower wings. This constitutes an aerodynamic structure of great interest. The spars are of the box veneer type.

The struts are all of steel tubing and of streamline section. Those three struts which meet at a point on the front spar of the upper wing are welded to the fuselage framework and are thus not removable. The interplane struts are of N shape welded together with an adjustable attachment at their ends.

The fuselage is made up of longerons and cross-struts of circular cross-section welded in place.

Atlantic City Meet

The second Pan-American Aerial Congress opened at Atlantic City, N. J., May 1, under very favorable circumstances. Among the prize winners thus far are:

First arrival ($500)—Roland Rolff in the Oriole, built by the Curtiss Aeroplane & Motor Corp. Distance 120 miles.

Second arrival ($250)—Eddie Stinson in JN-4 equipped with a Curtiss OX 90 h.p. engine.

Seaplane flight from Atlantic City to New York and return ($500)—E. K. Jaquith, first, in a 90 h.p. Curtiss M F boat; Beryl H. Kendrick, second ($250), same style machine.

Intercollegiate seaplane race, thirty miles ($250 expense money), S. Raymond Beckwith, University of Pennsylvania, first, in a Curtiss boat; Ensign M. S. Martin, Columbia, second; A. Post, Amherst, third.

On May 6 an "airplane arrest" was staged by fifteen members of New York's police air force, a "notorious motor bandit" being captured by the aviators.

Spectators have been entertained by no end of acrobatic flying.

Balloon Race at Akron

Nine balloons will start from Akron this afternoon in a race to defeat all previous distance records for lighter than air bags.

This number was announced officially, following a meeting of the Race Committee of the Akron Flying Club at the Goodyear plant.

Those in charge of the race, in addition to the Flying Club Race Committee, are: Colonel Hensley, Major Thomas S. Baldwin and George Hackensmith.

Answers to Correspondents

All bona fide inquiries will be answered by letter to the inquirer and included in these columns. Questions should be accompanied by stamped addressed envelopes.

L. G.—What is the difference between the high and low-compression Liberty engine, the latter being the one used in the Navy's trans-Atlantic flight?

The sole difference is in the piston, the high-compression piston having a domed head and the low-compression piston almost a flat head. The two engines are similar in all other respects. With the high-compression piston the gas is compressed to 18.0 per cent of its original volume, and in the low-compression system to 20.5 per cent. This means that the high-compression engine will have a higher effective pressure and deliver more power, but it will not stand up so well under a long trip, which is why low-compression engines are selected for this trip.

R. W. G.—The description of the single-seater airplane published in AIRCRAFT JOURNAL for April 19 contained as much information as in the original article, and no other specifications of this machine are available, as it is only a suggestion.

CLASSIFIED ADVERTISEMENTS

Rates, 25 cents per agate line per insertion. Black face type, 50 cents per agate line. Forms close Saturday preceding date of publication.

WANTED—Several 30 to 60 H.P. motors in good condition and cheap. H. Lewis, 5119 Indiana Avenue, Chicago, Ill.

ACKERMAN LANDING GEAR

Is the latest and highest development in the construction of Landing Gear

Their SIMPLICITY STRENGTH and SERVICE make them the logical equipment for the Modern Airplane

Weight 96 pounds complete with tires built for craft weighing 2500 pounds

WHEELS and LANDING GEARS built for any size machine

Complete data on Ackerman Equipment is available for Designers and Engineers.

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A Million-Dollar Order

Quite a fair sized order for Paragon Propellers. Our largest single fixed price contract amounted to $1,056,000.00. We made our deliveries on time and handled the entire order without friction or delay. Our smallest orders receive the same care and attention as the largest. If you need one or one thousand talk it over with us.

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AMERICAN PROPELLER & MFG. CO. TRADE MARK PARAGON BALTIMORE MARYLAND U.S.A.

U.S.

U. S. Letters for collar insignia as prescribed by General Orders No. 74

FOR ALL OFFICERS
OF THE
UNITED STATES ARMY

Bronze of best quality with safety catch, 60 cents per set; without safety catch, 50 cents per set. Ready for immediate shipment.

The official standard samples on file with the War Department were manufactured by this Company.

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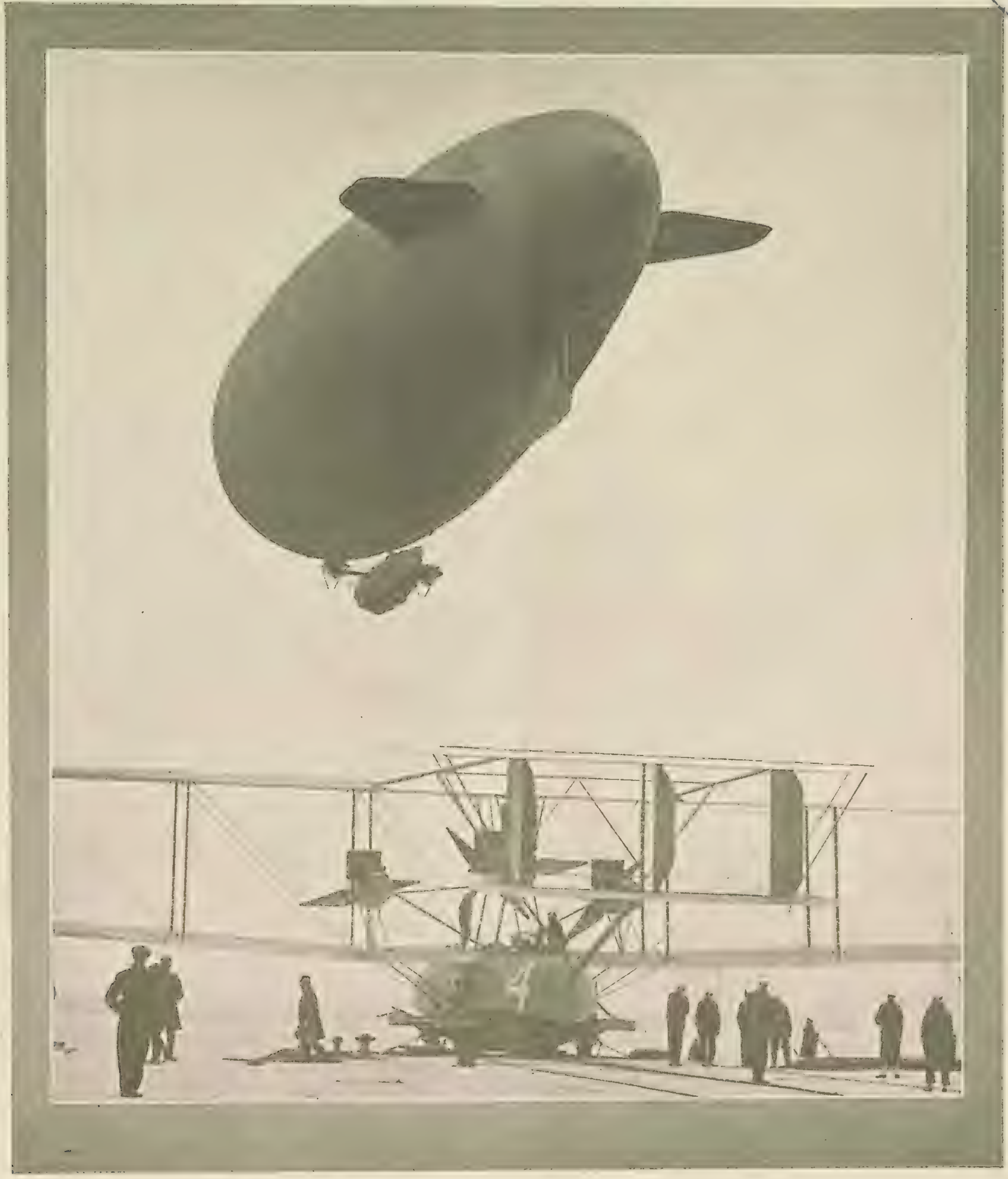

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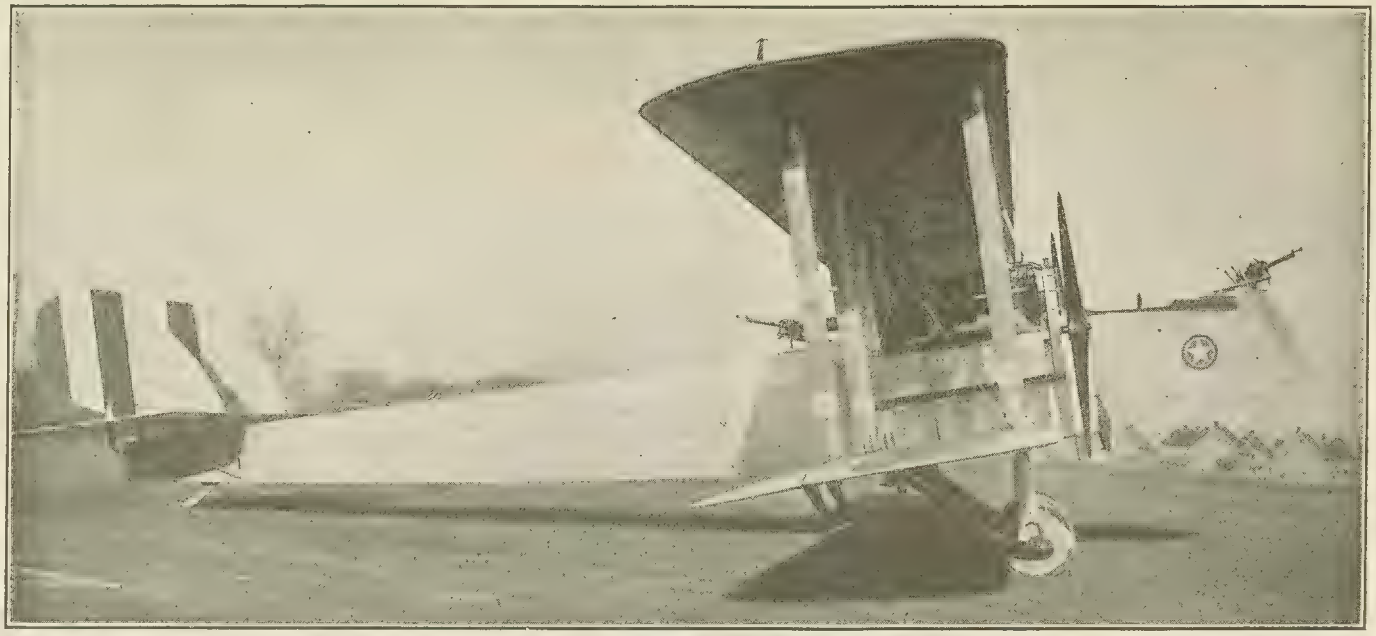
Navy Dirigible C-5 May Try the Atlantic Hop

This Photograph Was Taken Shortly Before the Start of the NC-4



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NC-1 and 3 Awaiting Fair Winds

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Both Make Fast Time to Trepassey Bay, N. F. But the NC-4 Encounters Engine Trouble

Commander John H. Towers, U. S. N., in charge of the NC seaplanes attempting to cross the Atlantic Ocean, made the following report to the Navy Department from Trepassey, N. F., Monday, May 11:

"Left Rockaway in NC-3 accompanied by NC-4 and NC-1 at 10 A. M., May 8, proceeding in formation along the south coast of Long Island; thence to Vineyard Sound to Chatham; thence to Seal Island. Received radio from NC-4 at 2:10 P. M. that they were running on three engines and might be compelled to land. NC-4 dropped astern and shortly later was lost sight of. It was believed that she had turned to land near the McDermut, which was barely visible off our port quarter.

"From Seal Island proceeded in company with NC-1 to Nova Scotia and up the coast to Halifax, NC-3 landing at 7 P. M. and NC-1 at 7:10 P. M.

"Started refueling from the Baltimore immediately and completed at 2 P. M., May 9. Made arrangements to leave for Trepassey at 8 A. M. May 9, but discovered cracked type on push propeller of NC-3 and three propellers of NC-1 in a similar condition. Obtained four hubs from Canadian air station and replaced damaged propellers with spares from Baltimore. On attempting start on the morning of May 10 the starter on pusher engine of NC-3 broke. Signaled NC-1 to proceed to Trepassey. Replaced starter and left Halifax at 8:15 A. M. Landed thirty-eight miles northeast of Halifax and examination showed starboard tractor propeller, type 5381, had cracked tip. Returned to Halifax, arriving at 10.30 A. M. Removed propeller from center tractor engine and put it on starboard tractor.

"Left Halifax at 11:30 A. M. and proceeded to Trepassey, landing at 6:30 P. M. The total time from Halifax to Trepassey was NC-3, 6 hours and 50 minutes; NC-1, 6 hours and 56 minutes.

Difficult Landing at Trepassey

"Each seaplane spent approximately forty minutes manoeuvring for landing at Trepassey under very adverse weather conditions. Winds as high as 45 miles an hour were encountered, although fairly smooth air was found at 3500 feet. Engines functioned well on both legs. Radio telegraph maintained excellent communication. Navigation was rendered difficult by the high velocity and varying directions of winds and necessity of flying high to avoid rough air, but means are regarded as satisfactory.

"Engaged in overhauling and refueling NC-3 and NC-1 and will start for Azores when conditions are favorable."

The NC-4, which started with the others and was reported "missing" through Thursday night, May 8, arrived safely at Chatham, Mass., at daybreak May 9, with all hands well. Three of her four engines had gone dead, and she had been forced to alight on the water Thursday evening; but cruising as a surface ship she made her way to land with the remaining motor. She was ready to proceed May 10, awaiting only favorable weather.

Naval officers pointed out the fact that of the three planes which started from Rockaway the NC-1 is the only one which has had no trouble. This is the original NC craft, launched last fall, which made several long distance flights before and just after the signing of the armistice. At that time she carried a Davis gun and machine guns, but had only three motors. The other planes, it is said, have only recently been built and had done no long distance flying until the start of the present journey.

Entries for the Cross-Ocean Flight

Six nations are represented in the struggle to win the honor of the first flight across the Atlantic Ocean. The entries are as follows:

FROM NEWFOUNDLAND TO EUROPE

Airplane	*Pilot*	*Nationality*	*First stop*	*H.P.*	*Speed*
NC-1	Lt. Com. Bellinger	U. S.	Azores	1,600	75
NC-3	Com. Towers	U. S.	Azores	1,600	75
NC-4	Lt. Com. Read	U. S.	Azores	1,600	75
Handley Page	Major Brackley	English	Ireland	1,500	95
Martinsyde	F. Raynham	English	Ireland	385	100
Fairey	S. Pickles	Australian	Ireland	375	130
Whitehead	A. Payne	English	Ireland	1,600	115
Sopwith	H. G. Hawker	Australian	Ireland	375	100
Seaplane	H. Sunstedt	Swedish	Ireland	440	——
Felixstowe Fury	Col. J. Porte	English	Ireland	1,875	110
Alliance Aeroplane Co.	Capt. W. R. Curtis	English	Ireland	450	——

Distance to Ireland—1,900 nautical miles.
Distance to Azores—1,200 nautical miles.
A nautical mile is one and fifteen hundredths land miles.

FROM EUROPE TO AMERICA

Airplane	*Pilot*	*Nationality*	*First stop*	*H.P.*	*Speed*
Short	Maj. J. C. Wood	English	Newfoundland	375	95
Farnum	Lieut. Fontan	French	Pernambuco	——	——
———	Capt. Coli	French	Pernambuco	——	——
Caproni triplane	———	Italian	———	——	——

The distance from Cape Dakar to Pernambuco is 1,800 miles. This is the French route.
The Italian entry is not yet completed, and secrecy is shrouding both its progress and proposed route.

Blimp May Try the Flight

It is possible that the Navy planes which are to attempt to cross the Atlantic Ocean as soon as weather conditions permit a "jump off" from Newfoundland will be followed closely by the Navy dirigible C-5, according to a Navy Department announcement.

The dirigible, under the command of Commander E. W. Coll: is now at Montauk Point, preparing for a trial trip to Newfoundland approximating 1000 miles. A successful trip between these points probably will mean an attempt, within a very short time, to make the flight to the Azores, over the route as mapped out for the Navy planes. The official announcement read:

"The Navy Department is informed that the Naval airship C-5 is ready for a start from the naval air station, Montauk Point, N. Y., for St. John's, Newfoundland, whenever weather conditions are favorable.

"The C-5, the newest of the navy's twin-engine dirigibles, will make the trip to Newfoundland as an experiment flight to demonstrate what she can do in regard to distance and how she will operate under varying weather conditions.

"The trip is made at this time and along this route to take advantage of the fact that the department has ships and personnel all along the way from the starting point to St. John's where the U. S. Chicago has been sent to act as station ship for the dirigible.

"Upon the outcome of this experimental flight will depend the future plans in regard to the possibility of attempting later a transatlantic flight by a dirigible."

The C-5 is commanded by Commander L. W. Coll, U. S. N., and the present crew comprises Lieutenant J. V. Lawrence, Lieutenant (J. G.) M. H. Easterly, Ensign D. P. Campbell, Chief Machinist's Mate T. L. Morrman and Chief Machinist's Mate S. H. Blackburn.

The C-5 is a twin-engine non-rigid airship of the C class, powered with two 125-horsepower union engines; envelope No. E 100, manufactured by the Goodyear Tire & Rubber Company, Akron, Ohio; car No. A 4126, manufactured by the Burgess Company, Marblehead, Mass. Her specifications follow:

Envelope displacement, approximately 178,000 cubic feet.
Envelope length, 192 feet.
Envelope diameter, 41 feet 9 inches.
Normal speed, 50 miles an hour.
Endurance at normal speed, 10 hours.
Useful load, 4,000 pounds.
Crew, six men.
Maximum attainable height, 8,600 feet.
Car length, 40.
Fuel consumption approximately 10 gallons an hour at a speed of 42 miles an hour.

Six Legs to Be Made

The transatlantic flight will be made in six legs, and the distances are here officially given both in sea miles and statute miles:

	Nautical Miles.	Land Miles.
Rockaway to Halifax..........	540	621
Halifax to Trepassey Bay.......	460	529
Trepassey Bay to Horta.........	1200	1380
Horta to Punta del Gado.........	150	172
Punta del Gado to Lisbon........	800	920
Lisbon to Plymouth.............	775	891
Total, New York to Plymouth..	3925	4514

NC-3 (left to right) Comander John H. Towers; Pilot Com. H. C. Richardson; Pilot Lt. D. H. McCullough; Radio Operator Lt. Com. R. A. Lavender; Engineer Mechanic L. R. Moore; Reserve Pilot Eng. Lt. B. Rhodes.

Photos by Central News Photo Service

May Carry Six Men

Experience gained in the trip to Newfoundland from Rockaway has led Commander Towers to determine to carry six men on the trip if possible, as well as spare propellers—which so far have given him his greatest trouble—and more gasoline. He contemplates raising the gross load of the seaplanes, that is the load including the weight of the ships themselves, to 28,800 pounds, instead of the 28,000 pounds originally calculated.

The sixth man will be qualified both as an engineer and as a pilot, but he will be principally needed as an engineer, for it is hardly to be hoped that the engines will run without some trouble, but trouble that a couple of good engineers can nip while still in the air—in the 1,200 mile trip to the Azores.

Some difficulty is anticipated by Commander Towers in getting the ships off the water with 28,800 pounds. They have never been tried out with so great a load upon them, but once off, the motors will rapidly burn up the gasoline which weighs down the ship, and each hour will mean a lighter and, if it is deemed wise, a faster ship.

Commander Towers made it plain that the effort to get off the water with 800 pounds of extra weight would be merely an experiment, and if it failed, the trip would be made on the original schedule of 28,000 pounds flat. The seaplanes easily bore the weight of 24,000 pounds in the flight from Rockaway, so it is the commander's belief that they could bear a greater load. It is said that the amount of gasoline burned in the two flights up the American coast has convinced Commander Towers that a little more fuel aboard would be a wise precaution.

The principal reason for this big consumption of gasoline was the amount used in fighting the way against head winds on approaching the Newfoundland coast. The pilots are said to have had no easy time in making land against the gusty wind, and are now very distrustful of the winds about the Newfoundland coast, which must be passed before the steadier air currents of lower latitudes are reached.

Valuable information concerning wind currents, gusts, conditions of the sea, etc., is said to have been gained by the two seaplanes in their flight near Newfoundland.

Commander Towers is said to have made successful experiments on the voyage with apparatus put in use for the first time to ascertain the drift of the flying machines in the winds they were facing or crossing. The experiments have demonstrated the practicality of the invention, which, it is said, will be of great value in general use on airplanes hereafter.

The British fliers are still at their hangars near St. Johns, N. F., "awaiting favorable weather."

NC-1 (left to right) Lt. Com. P. N. L. Bellinger; Pilot Lt. Com. M. A. Mitscher; Pilot Lt. L. T. Barin; Radio Operator Lt. H. Sadenwater; Engineer C. I. Kesler; Reserve Pilot R. Christensen.

NC-4 (left to right) Lt. Com. A. C. Read; Pilot Lt. E. F. Stone; Pilot Lt. W. Hinton; Radio Operator Ensign H. C. Rodd; Engineer E. H. Howard (injured and replaced by Eugene S. Rhoads); Reserve Pilot Lt. J. L. Breese.

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Glenn H. Curtiss Has Full Faith in the NC Boats

Five Distinct Advantages in the Azores Route Selected by the Navy for the Atlantic Flight

By flying a curving route a considerable distance longer than the straight line distance of 1200 nautical miles from Newfoundland to the Azores the NC planes will gain nine hours from favorable winds, according to calculations made by Glenn H. Curtiss, joint designer with naval officers of the big seaplanes. Mr. Curtiss's figures are based upon average weather conditions in May over the Atlantic.

In the opinion of Mr. Curtiss the Navy has chosen not only the airplanes best adapted for the transatlantic venture, but also the best possible route. He says:

"There has been a difference of opinion as to whether the Newfoundland-Ireland or the Newfoundland-Azores-Portugal route is the better. The former is more direct. As one who has been interested in transatlantic flight since 1914, however, I can see five distinct advantages to the southern course. They may be listed as follows:

"1. It requires a maximum flight without landing of almost seven hundred miles less than does the northern route. The distance to Flores, the first Azores island, is only 1,200 nautical miles, as against 1,890 to the Scilly Islands, the nearest point off the Irish coast.

"2. It avoids the dangerous fog belt which lies to the east and northeast of Newfoundland.

"3. It is attended by more favorable weather generally — warmer, clearer and freer from atmospheric disturbances.

"4. It is in the path of steamer traffic and hence offers a greater element of safety in case it is necessary to make a descent in midocean.

"5. It is in the path of winds which under normal circumstances will increase by 40 per cent. the speed of the airplanes.

"The NC planes could doubtless have gone by the northern route. It is shorter than the southern. If the transatlantic voyage were to be admitted a hazard, better indeed to get it over within the quickest possible time, like a cold shower. But the Navy, I believe, wishes to prove that for the right type of plane the Atlantic trip is not a hazard. The present flight is to be the demonstration of how others like it can be made regularly."

Glenn H. Curtiss, the pioneer inventor of the flying-boat, deserves a great share of the credit for the excellent performance of the NC class of seaplanes. He has continuously perfected this type from a primitive stage to the present reliable multi-engined craft

Atmospheric Conditions Studied

Observations have shown, Mr. Curtiss says, that wind and other atmospheric elements are in the main constant in any part of the ocean during a given month. Between Trepassey Bay and Flores in the Azores the winds generally blow from the northwest, that is, directly on the tails of the seaplanes, thus adding wind speed to engine speed. The winds do not, of course, blow in one straight line from starting point to destination, but by comparatively slight changes of course the greatest advantage may be taken of the winds, just as a sailing ship sometimes lengthens her course to gain speed.

The flying boats, he predicts, will be blown away from the fog belt once they are through a small zone of cross winds just off Cape Race. In this connection it will be recalled that Commander John H. Towers expressed the opinion before leaving Rockaway that the most critical period in the entire flight of 3925 nautical miles will be the first two or three hours after leaving Trepassey Bay. During this period the engines, not thoroughly warmed to their work, will not be at greatest efficiency, the planes themselves will be laden to capacity with a gross load of something more than fourteen tons each, necessitating high engine speed, the winds probably will be unfavorable and fog may be encountered.

Once fairly started on the long trip, however, the winds, blowing at an estimated velocity of thirty miles an hour at 1500 feet, will be of great aid, the load of each will decrease at the rate of 650 pounds an hour, due to gasoline consumption, engine speed will be decreased and high visibility gained. According to Mr. Curtiss, if a curving course is followed to take full advantage of the winds, the flight would be made in twenty hours.

Whether this wind-line course has been selected by the Navy is not known, as Commander Towers would not disclose his plans in advance of leaving Trepassey Bay, but it is known that the Navy planes allow about twenty hours for the journey. It is possible that the Navy fears to place full reliance upon theorectical winds which, during the day and night in which the flight is undertaken, may practically be absent.

Even should the Navy entirely disregard winds the seaplanes will carry enough gasoline to make the 1200 mile journey with a small margin of gasoline left over. An average speed of about sixty-three knots must be maintained to reach Flores in twenty hours. The four motors of each NC craft will consume 650 pounds of gasoline, more than 100 gallons an hour at the start, but by the time the vicinity of the Azores is reached the seaplanes will be burning only 360 pounds of gas an hour.

To Fly at Economic Speed

Mr. Curtiss also points out that average weather conditions are questionable, saying that the British fliers have been waiting at St. Johns for more than a month for the usual easterly winds. The navy ships, he says, probably will not wait for ideal conditions, although, of course, they will not rush precipitately into head winds or stormy weather.

"Wind is not the only matter to be considered," Mr. Curtiss says. "The speed at which an aeroplane flies is determined by a number of considerations. The NC boats will not fly as fast as they can, for to fly at top speed would not be economical under the circumstances. Top speed uses up more fuel in proportion to distance covered than certain lower speeds, and in a trip like this gasoline and oil must be carefully conserved. In other words, economy of energy is necessary for the purpose in view. The flying boats are in a sense like a runner. To start for the Azores at top speed would be somewhat like beginning a mile run with a 100 yard dash. They might draw on their fuel supply to a dangerous point. In any trip, therefore, where a saving of gasoline is desired the motor is run at what is called the economic speed. This is the speed at which the greatest ratio of miles an hour to gasoline consumed may be obtained.

"For instance, going at seventy-five miles an hour might demand a larger consumption of gas in proportion to speed than going at seventy miles an hour. But the economic speed also varies with the amount of load carried. For instance, at the beginning of the present trip a speed of seventy-one miles an hour (regardless of wind) ought to be most efficient. This speed is higher than it would be if 28,500 pounds did not have to be supported. Consequently as this weight is reduced by the consumption of oil and gas the economic speed lessens, less power being required to support less weight, and less forward progress.

"Thus if a flight of thirty hours were to be made the economic speed would have decreased at the end of the voyage from seventy-one to sixty-one miles an hour. This would have followed a decrease in load of 1000 pounds the consumption for that period of oil and gasoline. The reduction would have been marked by the shutting off of one of the three motors with which the flying boat had been propelled after its takeoff, it being possible to support the aeroplane with two motors after about 6500 pounds of gasoline and oil had been consumed, leaving a reserve of two motors during the remainder of the trip."

Planes May Go Past Flores

Mr. Curtiss estimates the time of the flight to St. Michael, 150 miles from Flores, which may be passed in the air if the seaplanes are able to go further, at twenty-one hours.

"If normal conditions prevail the boats would have at the beginning a flight for three hours

(*Continued on page* 14)

Southeastern Aeronautical Congress

Resolutions Urging Representatives to Adopt a Definite, Progressive Policy in Aviation Matters

The Southeasern Aeronautical Congress which was held in Macon, Ga., May 2 to 10 attracted civil, commercial and military leaders in aeronautics from all over the United States, together with several representatives of Great Britain. The Congress, which united conferences, flying demonstrations and an exposition, was called to formulate a definite program for the establishment of municipal landing fields throughout the region south of the Ohio River and east of the Mississippi, to the end that aerial navigation, which was developed so remarkably during the war, may be expanded and applied to peace time uses.

More than 200 commercial organizations participated, while more than two-score cities and a dozen states sent representatives. The Army and Navy officially joined in preparing for this Congress, the former by providing for addresses, exhibits and demonstrations, and the latter by addresses. Manufacturers of airplanes and airplane motors, on the invitation of the Macon Chamber of Commerce, which was instrumental in calling the Congress, sent extensive exhibits.

Each day throughout the period of the Congress was devoted to conferences, exhibits and demonstrations of the commercial possibilities of aeronautics as united with national defense on both land and sea and the extension of the aerial mail. The progrm included addresses by Senators and representatives in Congress, by Governors, by officials of Chambers of Commerce and Municipalities, by educational leaders, by officers of the Army and Navy, by representatives of the Post Office Department, and the airplane and motor manufacturers.

Major Hickam Appears for General Menoher

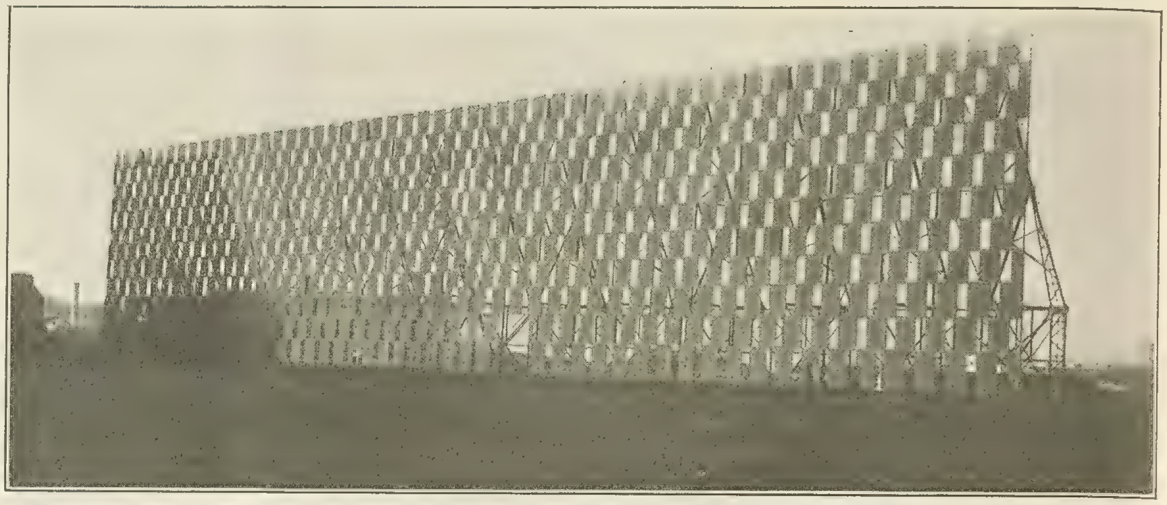
Major Gen. Charles T. Menoher, Director of Air Service, sent Major H. M. Hickam, Chief of the Inforamtion Section, to present to the Congress the plan of the Air Service for cooperating with municipalities in establishing landing fields. This plan was printed in the last issue of AIRCRAFT JOURNAL. Lieut. Commander N. B. Chase, Commandant at Brunswick, Ga., spoke for the Navy. Brig. Gen. L. E. O. Charlton, British Air Attache, delivered an address on the development of aeronautics abroad, and Fay L. Faurote, of the Curtiss Aeroplane & Motor Corp., illustrated his lecture on the history of aviation with stereopticon slides. There was brought to Macon for the benefit of the delegates from all over the South a collection of aeronautical equipment, airplane motors, balloons and war trophies second only in size and interest to the great exposition held early in March in New York City. The Air Service shipped from McCook Field at Dayton, Ohio, a Fokker and a Rumpler—captured German planes—a Spad and a Nieuport—French flying machines; a British S-E 5 and the All-American Hispano-Suiza motored Vought-E-7. A Thomas-Morse scout, a Curtiss JN-4, a DeH-4, a LePere, and a Curtiss JN-4D and a Dayton-Wright aerosedan also was exhibited.

From Dayton there also was sent a gunnery exhibit and from Kelly Field in Texas, a mechanical exhibition. A wireless telephone and phonograph exhibit came from Bolling Field, Washington and from Souther Field, at Americus, Ga., there was sent a Liberty 12, an American modified and built Hispano-Suiza, a Curtiss OX and LeRhone motors.

Two of the most notable features of the exhibition were the famous stripped show machine, built by the Curtiss Aeroplane and Motor Corporation, of Buffalo, for the New York Exhibition. This is a JN-4 model, one-half of which is fully finished and the other half partly, so that the visitor may literally see how an airplane is built and controlled. This ship also contained a motor open to view.

Other Exhibits

The Shark, a battle plane developed late in the war by the L-W-F Engineering Corporation of College Point, L. I., and which is unique for its armament and armor, came by express. "The Shark," in addition to possessing enormous speed and remarkable maneuverability, carries seven machine guns, four of which are synchronized so that the bullets pass between the blades of the propeller; two of the guns are mounted in the rear cockpit, while the seventh extends its snout downward through the bottom of the fuselage, thus giving this two-place battle plane fighting power in front, above, to either side and below.



Great wind screen outside a British rigid airship shed

Photo. Central News, Ltd., London

The Wright-Martin Aircraft Corporation of New Brunswick, N. J., sent a Hispano-Suiza 300-horse-power engine, so exposed and mounted that it could be examined in detail. In this exhibit there is also a parts board showing how the motor manufacturers responded to the call during the war and, presented with a new problem, produced from the original European model a greatly improved and thoroughly American Hispano-Suiza motive plant around which many American ships are now being built.

One of the practical features of the Congress was the flight from Washington of a Glenn L. Martin bomber built by the Glenn L. Martin Company of Cleveland, Ohio. This bomber was flown the 650 miles from Bolling Field to the new landing field in Macon by Captain Roy N. Francis. Complementing the display of the bomber itself was an exhibition from the Glenn L. Martin factory which showed how this great two-motored engine of war is being transwormed into a 12-passenger vehicle of peace and is actually being put into operation in several parts of the United States.

In addition to the Glenn L. Martin bomber there was available for demonstration during the period of the Congress various types of airplanes among which were two Curtiss JN-4H powered with 150-hp. Hispano-Suiza motors from Carlstrom field and three Curtiss JN-4Ds powered with Curtiss OX motors from Souther Field.

The following resolutions were adopted unanimously:

WHERAS, Improved transportation being one of the principal elements necessary to secure to the United States the prosperity due her from commerce, industry and agriculture, and

WHEREAS, This Southeastern Aeronautical Congress has been called to take official cognizance of aerial navigation, in which our country was the pioneer, and

WHEREAS, Our country neglected aeronautics until the great war made immediate development imperative, and now with the closing of the war finds itself at the beginning of a new era, when greater achievements than those already recorded by the airplane may be expected as the new art develops.

Now THEREFORE, Through the inspiration and information derived from this conference, be it

RESOLVED: That the wonderful gains made possible by the war be not dissipated through inertia or indifference, but that the United States claim its rightful heritage—leadership in the air—and that steps be taken at once toward the gaining of this end, and be it further

RESOLVED: That the representatives in Congress of the States participating in this Southeastern Aeronautical Congress be petitioned and urged to promptly accept their responsibility and labor for the adoption of a definite policy which shall establish and maintain America's position among the flying nations, assuring to the military and naval establishments the support of an adequate aeronautical industry and peacetime personnel, and be it further

RESOLVED: That our Congressional representatives be advised to acknowledge the international features of aerial navigation, that they take immediate steps to participate in the formulation of international air codes, that they recognize the governmental responsibilities and commercial possibilities for aeronautical development in Central and South America and that they cause aviation missions, with trained and equipped personnel, to be assigned to the various embassies and legations of the United States, and be it further

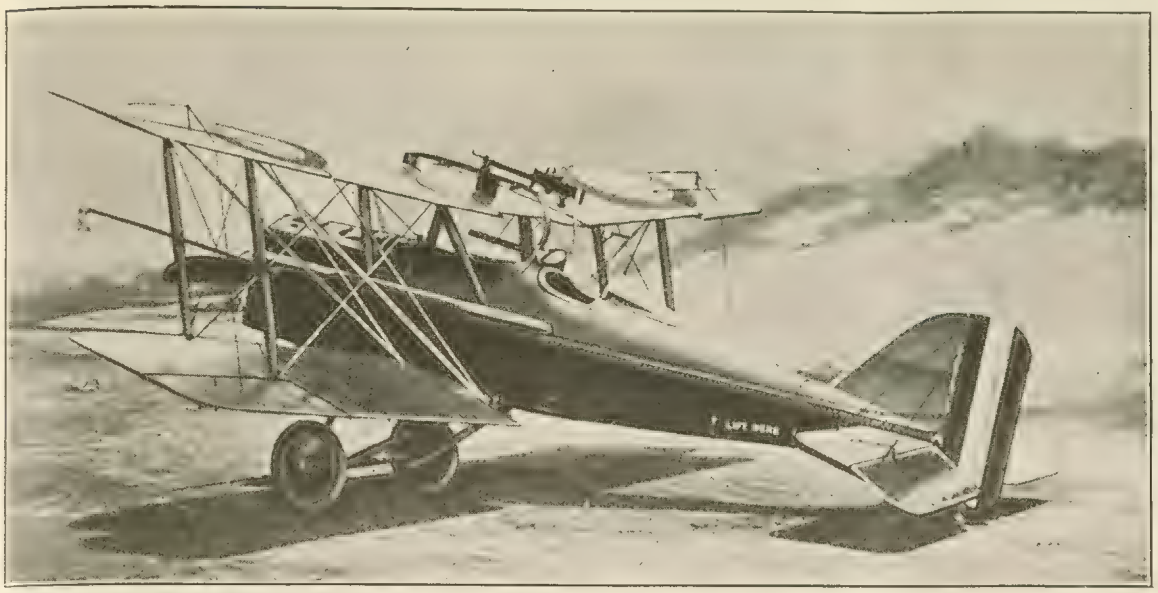
RESOLVED: That having in mind the legislative errors committed during the early days of railroad transportation, the principle of Federal control and guidance in aeronautics be acknowledged and the several States be advised to recognize and accept this fact and give their support, if necessary, by concurrent legislation, and be it further

(*Continued on page* 13)

The World's Airplanes and Seaplanes—SE-5

Group 1. No. 2—The SE-5

In spite of its somewhat ugly appearance and much adverse criticism the SE-5 did much useful work at the front, and it was only towards the very end of the war that it was being displaced by faster single-seaters with 300 hp. Hispano-Suiza engines.



American SE-5, with 180 hp. Hispano-Suiza (side view)

Power Plant

180 hp., 8-cylinder V Hispano-Suiza.
Propeller, 8 ft. 0 in. diameter.
Main gasoline tank.

Main Dimensions

Span, upper and lower wing, 26 ft. 9 in.
Chord, upper and lower wing, 5 ft. 0 in.
Gap, 4 ft. 10 in.
Dihedral, 5 deg.
Incidence of wings to propeller axis, 5 deg.
Overall length, 20 ft. 10½ in.
Overall height, 10 ft. 0 in.
Wing area (including ailerons), 245 sq. ft.
Ailerons on top and bottom wing, 4 ft. 6½ in. by 1 ft. 9 in.
Stabilizer area (adjustable), 14.6 sq. ft.
Elevator area, 15.2 sq. ft.
Rudder, 5.4 sq. ft.
Upper vertical fin, 4.6 sq. ft.
Lower vertical fin, 1.5 sq. ft.

Load Distribution

Gross loading, 2060 lb.
Weight, empty (with water), 1485 lb.
Fuel and oil, 239 lb.
Military load, 155 lb.
Crew, 180 lb.
Wing loading per square foot, 8.4 lb.
Load per horsepower, 11.4 lb.

Performance

With a gross loading of 2060 lb., the performance was as follows:

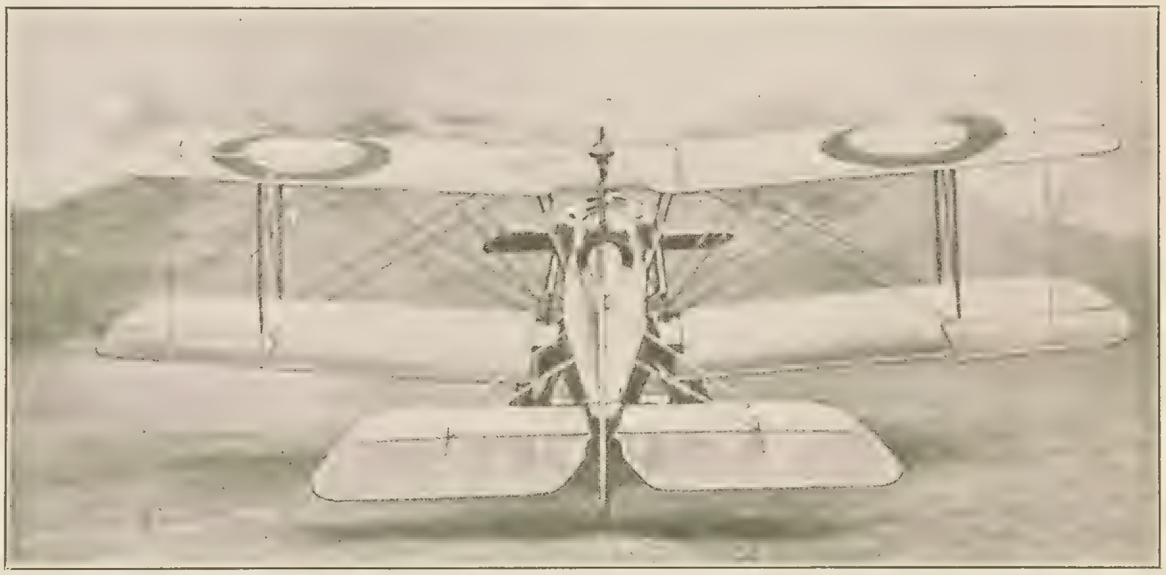
Climb (ft.)	Time.	Maximum speed at this altitude.
0		121.6 m.p.h.
6,500	8′	120.0 m.p.h.
10,000	13′	117 m.p.h.
15,000	22′ 10″	109 m.p.h.
20,000	50′ 30″	92.5 m.p.h.

Service ceiling, 20,400 ft.

The SE-5 offers several features of interest. Stream-line wire is used for the interplane bracing, flying wires being double and landing wires single. The supplementary lift wires shown in the photograph and attached to the upper spar toward the body serve to relieve the upper spar of a load which might otherwise make the wing construction heavy and clumsy.

The tail plane is a double cambered surface, and the stabilizer has a wide adjustment in flight of between +4.5 and —3 deg. To this and the front spar is pivoted, while the rear spar, with its wiring, is fixed to a tube which can be moved relative to the fuselage by means of a gear nut. The gear nut is controlled from the pilot's seat by a wheel and cable.

The tail skid shows an unusual construction, being arranged turnable behind the stern post and connected with rudder cable by means of spring.



American SE-5, with 180 hp. Hispano-Suiza

The fuel, sufficient for two hours' flight, is carried in a large main tank behind the engine and in a small gravity tank.

A fixed Vickers' machine gun is mounted to the left of the pilot inside the body. On top of the center section is a Lewis gun, which can be pulled down in flight to permit vertical firing, a very useful military feature.

Airship Transportation

The Akron Chamber of Commerce is endeavoring to impress kindred bodies throughout the United States with the importance of arousing public interest in airship transportation. In a recent letter Secretary Vincent S. Stevens says:

"In the United States comparatively few civilians have come to realize as yet that the day of commerce of the air by dirigible airships and aeroplane has arrived and that already Great Britain is found in the familiar shipping position leading all competitors in the construction of dirigible airships and with plans for tying together her vast empire including Australia, New Zealand, India, the Africas and Canada with speedy straight line air service using airships of mammoth size and capable of carrying many tons of mail, cargo and passengers. Germany is also active in improving and building giant Zeppelins and preparing them for immediate use in competition for world commerce.

"The construction of monster airships is too big a problem for any one corporation to finance. The problem can only be met through proper appropriation of Government funds. This is the method in use in England. Funds are needed to provide for the design and construction of ships, landing fields and mammoth construction and docking facilities.

"The Navy and the Army air officers naturally have been among the first to see the immediate need for improving America's position and they already have had many conferences and laid many plans. Unfortunately, however, Congress has adjourned and left these plans high and dry for lack of appropriations.

"America has no commercial airship today, nothing but a few small ships. England is ready today with a dirigible which will soon attempt to cross the Atlantic.

"In the face of the after-war debt and the many demands for funds there may be considerable difficulty in convincing Congressmen and Senators of the necessity of the appropriation in question. As a matter of national interest we feel that this must be done, and therefore ask you to join with us in bringing this proposition before your Representatives and Senators at the earliest possible date, and also ask you to appoint a committee on aeronautics to study these matters for your organization."

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Formerly Air Service Journal

More Orders for Airplanes

THE announcement of Assistant Secretary of War Crowell that orders will be placed in the near future with constructors for types of airplanes needed by the Air Service confirms the opinion expressed by the AIRCRAFT JOURNAL in recent issues. While the orders will probably be given only in experimental lots of fifty or a hundred machines of a type, they will give the industry an opportunity to demonstrate by competitive performance the merits of the machines for combat.

The ever present problem in the design of aircraft is the suddenness with which types appear and disappear owing to the advance in some particular feature of construction. The great advantage a slightly increased performance gives to an airplane built for combat work is so important that it almost completely supersedes the older machines. This fact has always been an obstacle to the production of advanced types in large quantities. It also has led to the payment by the government of costs which result from building experimental work.

Another difficulty that has been a serious problem to settle is the constant addition and alteration of equipment that is placed on combat airplanes. The moving of a gun or an instrument sometimes means a change in fifty to a hundred working drawings and this interferes with production as well as causing expense for wastage. It is probably one of the inevitable difficulties of manufacturing war equipment.

The financing of airplane companies is also to be one of the factors that will have to be given due consideration in connection with prices. On a cost plus basis with a large volume of business, and advances on account, it was comparatively easy to interest bankers in an airplane project. But as a straight business proposition with all the difficulties of negotiations with the War Department, based on past experience, capital will have to be assured of a return comparable with that received in other manufacturing ventures.

During the war companies who were so equipped that they could build airplanes and engines with slight alterations of their plants were induced to manufacture aeronautical parts or accessories. They cannot be counted on to assist in the future plans of the government. The older airplane companies and constructors are to be the mainstay of the production program and should be encouraged in every way to expand soundly.

Built-Up Wing Spars

IN recent airplane practice we find an increasing use of built-up wing beams. An almost endless variety have been tried by constructors and Government laboratories. The practice arose in the first place because of the necessity of economizing on spruce. In the ordinary wing beam a comparatively large part of the spruce log has to be employed, and defects such as spiral grain, pitch pockets, knots and so forth caused a great many rejections. By utilizing built-up beams it was found possible to use smaller pieces of spruce and thus rejections were fewer in number.

But although this was the primary reason for the use of built-up beams, other advantages were soon apparent. Thus in a built-up beam it is possible to use a comparatively soft and light wood such as spruce in the flanges, and take the horizontal shear at the center of the beam by the vertical plies of a veneer combination, whose horizontal plies take the vertical shear. Wood is not a homogeneous structure, that is, its strength in various directions is not the same, and the employment of veneer makes it more homogeneous, and enables the designer to use much less shear resisting material. Since wood is so much stronger in tension than in compression it might also be advantageous to use ash for the compression side of a built-up beam and spruce for the tension side. If the greatest possible degree of lightness is sought for and the wing spar has a section varied along its length to make the factor of safety more uniform, the ordinary type of I section spar offers production difficulties in the varying routing required. With a veneer box construction there is no routing, the flanges are merely planed down to a varying thickness, a comparatively simple proposition.

On the other hand, in built-up spars, whether glue, rivets or screws are used for connecting purposes, there is always a good deal of weight lost, and strength for a given weight is therefore not quite so much better than for an I section as might at first be expected. There are also greater difficulties as regards inspection for a built-up beam.

On the whole it would seem as if built-up beams offer a very fruitful field, but it is not in every case that they will be advantageous and each new type has to be studied on its merits.

Congress and the Air Service

WITH the convening of Congress on May 19 the matter of peace time organization of the Air Service again will be brought to the front. That there will be a wide difference of opinion is certain. The advocates of an Independent Air Service will probably have an easier position to defend than formerly and unquestionably will go far toward creating a separate department.

The Navy which has always been opposed to any merging of its air service with that of the Army will have great prestige to back its contentions by the successful feat of flying the Atlantic. This achievement may, however, result in such great enthusiasm by the country at large that congressmen will give the separate service a trial.

The return of the Secretary of War and Secretary of the Navy from overseas where they have had opportunities to observe closely the success of independent air forces will enable them to give direct opinions as to their observations.

One Year of the Air Mail

JUST a little more than a year ago an Air Mail Service was established between New York and Washington. Then, as now, the scoffer at all things aeronautic was abroad in the land—but he no longer jibes at the enterprise of the Post Office Department.

With a record of 92 per cent of performance for the entire year, notwithstanding a period of exceptionally stormy weather, Second Assistant Postmaster General Otto Praeger may well felicitate himself upon the splendid demonstration of the usefulness and excellence of the service, due in no small measure to his far-sighted vision and his determination to succeed.

During the year 128,037 miles were flown, the planes carried 7,720,840 letters, and the revenues from stamps exceeded the cost of the service by over $21,000.

From this time forward there will be important extensions to the service, the extent of the development depending wholly upon the acquisition of equipment.

News of the Army and Navy Air Services

Meritorious Service

The attention of the Director of Air Service has been invited to exceptional service rendered by M. E. Victor V. Allison, Air Service Mechanics School Detachment, Kelly Field, Texas, on the occasion of the exhibition of the Victory Loan Flying Circus No. 2, Mid-West Flight, at Milwaukee, Wis.

The flying field selected, Washington Park, was surrounded with trees and houses on all sides, the field was also enclosed by a fence, inside of which on three sides was a trench, making it a very hazardous field.

Landings were made with great difficulty by all the Curtiss ships on exhibition and the entire personnel of the circus was greatly concerned over the great difficulty which would be encountered in the landing of the Scout planes. Three attempts were made by 1st Lieut. F. O. Carroll, A. S. M. A., piloting a Spad plane, to get on the ground. Each attempt was unsuccessful owing to the trees, fence, and ditch, surrounding the field. After each attempt the pilot again circled the field. Finally he succeeded in making an excellent three point landing within about two hundred feet from the end of the field. The plane was rolling forward at an approximate speed of forty miles per hour and it was obvious to all that unless the plane was stopped or diverted the machine would be a total wreck and the pilot possibly injured. M. E. Allison rushed toward the plane and dove for the left wing, and grasping the same succeeded in diverting the path of the plane to the left and away from the fence and the ditch. He was dragged about seventy-five feet.

This act was witnessed by the entire circus personnel and 25,000 people. It required great courage and absolute disregard of possible serious injuries. Allison received several minor bruises about the arms and body, but immediately resumed his regular duties as crew chief of his ship, which was another from that which he saved.

About five minutes after this act he participated in diverting a Curtiss plane in practically the same manner bringing about the same results.

Changes in Station

The following named field officers have been ordered to change station:

Major Norman W. Peek, J. M. A., A. S. A., ordered from Pope Field, Camp Bragg, Fayetteville, South Carolina, to Ellington Field, Houston, Texas.

Major Albert Oliver Prince, A. S. A., ordered from Langley Field, Hampton, Virginia, to Wilbur Wright Air Service Depot, Fairfield, Ohio, to assume command.

Lieut.-Col. Bert M. Atkinson, J. M. A., A. S. A., ordered from Hazelhurst Field, Mineola, Long Island, New York, to San Francisco, California, for transportation to Honolulu, Territory of Hawaii, for duty as Department Air Service Officer.

Major Earl C. Zoll, A. S. A., ordered from Hazelhurst Field, Mineola, Long Island, New York, to Wright-Martin Engine Plant, Long Island City, New York.

Cancellations Withdrawn

During the week ended April 12, 1919, the Bureau of Aircraft Production withdrew cancellations and suspensions of contracts to the amount of $2,640,879, thus reducing the total of cancellations and suspensions of contracts since the armistice from $500,679,617 to $498,038,738. These withdrawals of cancellations and suspensions are practically all for spare parts and accessories.

Lt.-Col. Ira A. Rader, M. A., A. S. A.

Lieut.-Col. Ira A. Rader, Commanding Officer of Souther Field, was born in California July 30, 1887. He served through the required course of instruction at West Point, graduating in the class of 1911, and was assigned to the infantry. His first service was with this branch of the army, and he was stationed in the Philippine Islands.

When the war in Europe broke out and the U. S. began to be interested in aviation and the training of pilots for future emergencies, Colonel Rader was one of the first men to be assigned to the Air Service. He entered the work as a student aviator at San Diego, and applied himself to the subject with such enthusiasm and success as to win the rating of J. M. A. (Junior Military Aviator) by July of the year 1915.

When the situation in Mexico became so chaotic and General Pershing led the first punitive expedition into that country in 1916, Colonel Rader was one of the few aviators who accompanied the troops. Colonel Rader organized the first American bombing school in France, and conducted it so successfully that the next step in his military career was a promotion in July, 1918, to the grade of Military Aviator.

Colonel Rader remained on duty in France during the greater part of the heaviest fighting, and was present at the front as a member of the First Bombardment Group during the St. Mihiel and Argonne attacks.

In October of 1918 he was relieved from overseas duty and sent home to the U. S. to take command of the bombing school at Ellington Field, Texas.

Colonel Rader remained at Ellington in connection with the school till his present assignment as Commanding Officer at Souther Field.

The colonel is married, and will reside with his wife and year-old son in the bungalow at Souther Field, which has been occupied by the former commanding officers of the post.

Four Fly 1,300 Miles

The big Martin bombardment 'plane, with four on board, completed, on May 7, the round trip between Washington and Macon, Ga., flying the return distance of 650 miles without stop.

The passengers were: Lieut. Col. T. E. Gilmore, of the Royal Air Force; Major W. H. Frank, of the U. S. Air Service; Captain Roy N. Francis, Pilot and Lieut. E. E. Harmon, second Pilot. The party left Bolling Field, Washington, D. C. for Macon, Ga., Sunday, May 4, at 1:25 and arrived at Pinehurst, S. C. at 6:05 Sunday evening, stopping there over night.

"They left Pinehurst, S. C. at 9 o'clock, Monday, May 5," said Capt. Francis, but after passing Augusta, Ga., rainstorms were encountered and forty miles were flown in the rain and clouds. "The clouds kept driving us lower to the ground, and we were forced to land at Haddock, Ga., in the rain and fog. The field selected was not the best, but no damage was done in the forced landing. In an hour and a half's time the rain ceased and we proceeded on to Macon, Ga., which was only about fifteen miles away, arriving there at 3:40 Monday afternoon. A distance of 650 miles had been covered in a total of seven hours and fifty-five minutes flying time.

"On the return trip, we left Macon, Ga. for Washington, D. C. at 9 o'clock, but due to low clouds and poor visibility we had considerable trouble in finding the proper railroad to get our bearings on leaving Macon. We lost about three quarters of an hour flying around and orientating our ship and ourselves in the low clouds. Finally getting our correct railroad, we left Macon at 10:15 and flew a direct line to Washington, D. C., a distance of 650 miles, in six hours and fifteen minutes, non-stop, landing at Bolling Field at 4:30 Wednesday.

"On our non-stop flight back from Macon, we encountered at least five thunder showers in a distance of 200 miles. At times we were flying as low as 500 ft. and other times as high as 4,000 ft. We found when striking a rain storm, if we slowed the machine down, the rain would not damage the propellers as much as if they were on full speed; also, it was easier to drive in a rain at a slower speed."

The maps used were those of the Department of Navigation, A. S. A. These were geological survey maps, in a roll strip of about 75 miles width and of the total length of the Macon-Washington trip. The direct air line with proper compass course and emergency landing fields are noted on these maps.

There was no trouble, with fair visibility in locating every town or village passed.

R. M. A's

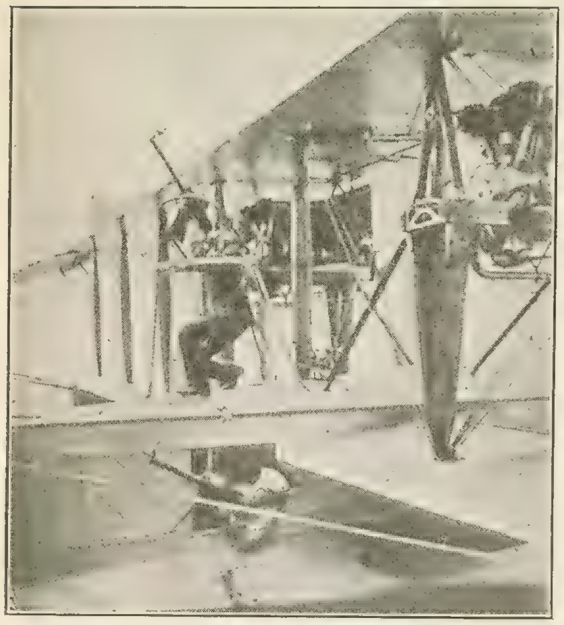
The following-named officers, having completed the required tests, are rated as Reserve Military Aviators, to be effective from the dates set after their respective names:

Capt. Louis R. Crawford, A. S. A., March 29; Capt. William G. Renwick, A. S. A., March 29; First Lieut. Ward R. Clark, Infantry, March 29; First Lieut. James C. Nabours, A. S. A., March 29; First Lieut. Clarence J. Moors, A. S. A., March 29; Capt. Paul R. Turpin, A. S. A., March 29; First Lieut.George E. King, A. S. A., March 6; Second Lieuts. Howard C. McGregor, A. S. A., March 6; Roy W. Chilson, A. S. A., March 6; Henry C. Gamble, A. S. A., March 6; John F. Dresing, Junior, A. S. A., March 10; James A. B. Roddie, A. S. A., March 10; John Wilson Albright, A. S. A., March 25; Ralph J. Leeds, A. S. A., March 29; Lester N. Stockard, A. S. A., March 29; Woodward C. Riley, A. S. A., March 29; William D. Jones, A. S. A., March 29; all 1919.

Notes on Technical Aeronautics

Gun Mounts on Navy Aircraft

In the two photographs appended, an interesting illustration is given of the way the Navy designers tackle the problem of gun mounting. The Davis gun is an ingenious non-recoil gun, which shoots a compensating weight from the rear-end, enabling it to fire a 3 lb. shot of deadly powers without disturbing the equilibrium of the boat. Mounted in the very front end of the Flying Boat it has a very wide range of action. The turret placed on top of the flying boat hull in the second photograph and the openings at the side for the light movable guns also provide very effective gun-fire.



Gun mounts on a Navy aircraft

Future Development of Naval Aviation

Commander J. H. Towers, in a recent paper before the S. A. E., discussed the future development of Naval Aviation:

The primary mission of Naval Aviation during hostilities was waging war against the submarines, and this naturally resulted in a rather one-sided development. We now have an opportunity, however, to look into the future and consider what lines of development will be most needed to make aviation an efficient and well-balanced arm of the Navy, and particularly of the great fighting force, the fleet.

Naval aviation development for the next few years will be along the following lines:

(1) Small airplanes or seaplanes for use from fighting ships for spotting, short distance reconnaissance and fighting.

(2) Medium-sized airplanes and seaplanes for use from large high-speed ships with "flying-off" decks or special launching and recovering arrangements, for medium-distance reconnaissance, torpedo carrying and bomb dropping.

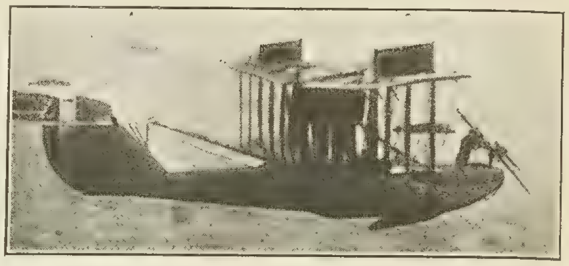
(3) Kite balloons and possibly airships, capable of being towed, to be carried by scouts and capital ships for spotting and reconnaissance purposes.

(4) Large seaplanes and airships to be based on shore for operations with the fleet and for operations as an independent Naval force when needed.

Under the first class the sizes are necessarily limited by the fact that they must operate from a fighting ship and not interfere with the primary function of that ship. Land-type airplanes are easier to launch, and have better fighting qualities, but on the other hand they must either return to shore or to a ship with flying-off deck, or land in the sea, with almost certain damage. Will their usefulness offset these disadvantages? That remains to be seen.

Under the second class, that of medium-sized aircraft for use from special ships, the question again arises, shall they be airplanes or seaplanes? There is no doubt about their being able to fly from land on the decks of special ships under reasonably good conditions, but in cases of engine failure we again have the airplane in the water. The launching of seaplanes by catapult has been developed to a satisfactory point, and several methods of recovering the seaplanes without stopping the ship have been suggested. Some of these methods have considerable merit, but require a vast amount of experimentation. Airplanes of the types desired are already in existence. The seaplane characteristics will be affected largely by the method of recovery to be used. I think it probable that a 300-hp. type will be selected.

Under the third class, those operating from shore bases, come the big seaplanes and the medium and big airships. The limit to the size of the seaplane is an engineering matter; what is wanted for operation is seaworthiness and long radius of action. I have no doubt that in a few years this type will be of several thousand horsepower, and it may have a steam power-plant. These seaplanes will compete with destroyers. They naturally have the advantage of speed and vision, but must also be able to navigate accurately for long distances out of sight of all fixed marks, to land in and rise from fairly rough water to exercise right of search and must be reliable and self-sustaining that they return to shore bases only as a destroyer returns—for rest, refueling and overhauls to machinery. Until this stage is reached they will be looked upon as nuisances, necessary, perhaps, but undesirable, especially if they make continued calls on surface craft for help.



H type Navy flying boat equipped with a Davis gun

Aeronautical Experimentation

During the war there has been a tremendous development of the technique of aeronautical experimentation. Before the war all the systematic testing a machine ever got was that of usage. Now a machine, before it is considered satisfactory for production, undergoes the most severe investigation. There are three main points of attack—(1) structural strength; (2) performance; (3) stability and controllability. In dealing with structural strength sand testing is an essential. In a sand test a machine is inverted and loaded with sand bags up to destruction. It is not absolutely certain that a machine which has been sand-tested is safe to fly, but no machine is safe to fly which has failed on sand test. All future commercial designs will certainly be submitted to sand-testing.

In studying performance, there are two main avenues of attack, the wind tunnel and full-flight tests. The value of the tunnel has been much discussed; if used in a skillful engineering manner its results can be correlated with those of the full-sized machine and give the most valuable results.

Full-flight testing has also been developed to a very high degree and is now a well-tried weapon of the aeronautical engineer.

Further rapid progress in aeronautics may be expected when these well-tried methods are generally applied.

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What Has Been Done In One Year of the Air Mail

Performance of 92 Per Cent, 128,037 Miles Traveled and 7,720,840 Letters Were Carried at a Profit

The Air Mail Service has been in operation between Washington, Philadelphia and New York one year, and has demonstrated the practical commercial utility of the airplane.

On May 15, the anniversary of the inauguration of the service, the public were invited to witness the flight of the mail planes at Belmont Park, N. Y., and College Park, Washington. A year ago when the first flight attracted universal interest, the establishment of the service was regarded generally as experimental and of doubtful results; today it is an established branch of the postal service. A new route from Cleveland to Chicago, is inaugurated, the route from New York to Cleveland, which will connect up the New York-Chicago service, will be put in operation as soon as the equipment is completed and other extensions will follow.

Air Mail

Top—Former battleplane convertedfor mail service, ready for flight with U. S.
Bottom—Mail compartment of the battleplane, remodeled for the U. S. Air Mail Service by the L. W. F. Engineering Co., Inc., College Point, N. Y.

The two airplanes that took to the air on May 15, one leaving Washington and one leaving New York, are the same that carried the mail a year ago and have been constantly in the service, and they are propelled by the same engines. One of these has been in the air 164 hours, flying 10,716 miles, and has carried 572,826 letters. It has cost, in service, per hour $65.80. Repairs have cost $480. The other plane has been in the air 222 hours, flying 15,018 miles, and has carried 485,120 letters. It has cost, in service, per hour $48.34. Repairs to this machine have cost $1,874.76.

The record of the entire service between New York and Washington shows 92 per cent. of performance during the entire year, representing 128,037 miles travelled and 7,720,840 letters carried. The revenues from airplane mail stamps amounted to $159,700, and the cost of service $137,900.06.

The service has been maintained throughout the year with a record of 92 per cent. gales of exceptional violence and heavy snow storms being encountered and overcome. Out of 1261 possible trips, 1206 were undertaken, and only 55 were defaulted on account of weather conditions. During rain, fog, snow, gales and electrical storms, 433 trips were made. Out of a possible 138,092 miles, 128,037 miles were flown. Only 51 forced landings were made on account of weather and 37 on account of engine trouble.

It has been demonstrated that flying conditions for such a commercial service as this, which is regulated by a daily schedule regardless of the weather, are very different from those of military flying. Airplanes designed wholly for war purposes are not suitable for commercial service, as they lack the strength necessary for daily cross-country work with its incidental forced landings. Aeronautical engineers have developed for the Post Office Department a stronger and more powerful plane suitable for commercial service while retaining the excellent flying qualities of the De Haviland machine. The De Haviland 4s which were transferred to the Post Office Department after the signing of the armistice are being reconstructed to fit them for commercial requirements. In specially constructed mail-carrying planes, for the building of which the Department has called for bids to be opened June 2, a form of construction is called for which will enable a mechanic to make important minor repairs in flight, making it possible with a multiple engine to avoid forced landings.

One of the lessons learned from the operation of the Air Mail Service during the year is that the element of danger that exists in the training of aviators in military and exhibition flying is almost entirely absent from commercial flying. Second Assistant Postmaster General Praeger, in reporting to the Postmaster General the operations for the year, says that the record of the Air Mail Service, which includes flying at altitudes of as low as 50 ft. during periods of marked invisibility, throws an interesting light on this question. During the year, more than 128,000 miles having been travelled, no airplane carrying the mail has ever fallen out of the sky, and there has not been a single death of an aviator in carrying the mail. The only deaths by accident which have occurred were that of an aviator who made a flight to demonstrate his qualifications as an aviator and that of a mechanic who fell against the whirling propellers of a machine on the ground. But two aviators have been injured seriously enough to be sent to a hospital. Other accidents consisted mainly of bruises and contusions sustained by planes turning over after landing. Of the three types of planes operated regularly in the mail service one type was more given than the others to turning over on rough ground and it was principally on planes of this type that pilots were shaken up or bruised by the plane turning turtle. One type of machine in the mail service, which has performed almost half of the work, has never turned turtle. The record of the Air Mail Service with respect to accidents will compare favorably with that of any mode of mechanical transportation in the early days of its operation.

Mr. Praeger says in his report that from experience it is learned to be useless to send against a 40-mile gale a plane having a top speed of no more than 75 or 80 miles.

"The two types of planes in the Air Mail Service of this speed," he said, "are the Standard JR 1 mail plane, having a wing spread of 31 ft. 4 ins., and the Curtiss JN 4 H having a wing spread of 43 ft. 7⅜ ins.

"Each plane of this type is equipped with a 150 hp. engine which does not provide enough reserve power to combat the disturbed air conditions at the surface in a wind of more than 40 miles an hour, especially if the wind comes in descending columns or gusts. Under these conditions it is possible to make headway only with a Liberty engine which has plenty of reserve power. A plane equipped with a 150 hp. engine, if it succeeds in breaking through the surface winds, can make only slow and laborious headway against a full or a quartered head wind of about 40 miles. There have been many instances where the planes equipped with 150 hp. engines have been held down to a speed of between 30 and 37 miles an hour; and also many instances where a hundred mile an hour plane equipped with a Liberty engine has been held to between 55 and 60 miles. A few wind storm conditions were encountered where the planes at the height of the gust were actually carried backwards."

The same six planes that were in operation at the inauguration of the service, and have been in continuous employment during the year, are in operation today.

Converted Battleplanes

The DH-4 battleplanes, which were remodeled by the L-W-F Engineering Company of College Point, L. I., have met all the requirements of the Post Office Department. The pilots who flew them are well pleased with these machines, which are faster and more powerful than the other mail planes.

The L-W-F Company removed the armament and military accessories and changed the pilot's cockpit from the front to the rear. The front cockpit was then altered so as to provide a rain-proof compartment holding about 500 pounds of mail.

Special designing by the L-W-F Company has overcome the faults pointed out by our aviators who flew these planes over the lines in France.

The standard L-W-F landing chassis of bent steel tubing replaces the wooden chassis and the four longerons of the body are braced from the radiator to beyond the splice in the body. Extra brace wires are attached to the engine section.

The plane carries fuel for four hours, which will give the planes a cruising endurance of 400 miles. The mail planes are just as fast as the battle-planes.

These ships are the most efficient planes in the mail service today, and will be used exclusively on the New York to Chicago route starting this month.

Back Pay of Cadets

2d Lieut. W. E. Smith, Q. M. C., issues the following pertaining to the pay of cadets while in training for commission:

Under a recent decision of the Comptroller of the Treasury, the Director of Finance has been authorized to make payment of all arrears in cadets' pay while in training for commission, in accordance with the following:

Cadets in the Air Service in training for commission should have been paid $100 per month, as follows: Those at flying schools from July 13, 1917, to include June 30, 1918; those at ground schools from August 21, 1917, to include June 30, 1918.

After July 1, 1918, their pay was reduced to $33.00 per month at both flying and ground schools. Cadet serving at flying fields, if placed on flight duty by special orders of the Commanding Officer of the field at which serving, are entitled to 50% increase on $33.00 per month, for the period covered by such orders.

Cadets serving over seas in the American Expeditionary Force who received $100.00 per month are not entitled to increase for Foreign Service.

All cadets who have a just claim for arrears in pay while serving as cadet in training for commission will write to the Director of Finance, Discharged Enlisted Men's Pay Branch, Room 3303 Munitions Building, Washington, D. C., requesting that they be furnished with the necessary blank forms to enable them to properly file claim for back pay which is due them.

Air and the Treaty

In the peace treaty handed to Germany by the Allied Nations are two clauses relating to the use of the air. The first is from Section VI:

Air.—The armed forces of Germany must not include any military or naval air forces except for not over one hundred unarmed seaplanes to be retained till Oct. 1, to search for submarine mines. No dirigible shall be kept. The entire air personnel is to be demobilized within two months, except for 1,000 officers and men retained till October. No aviation grounds or dirigible sheds are to be allowed within 150 kilometers of the Rhine or the eastern or southern frontiers, existing installations within these limits to be destroyed. The manufacture of aircraft and parts of aircraft is forbidden for six months. All military and naval aeronautical material under a most exhaustive definition must be surrendered within three months, except for the 100 seaplanes already specified.

And the second is from Section XI:

Aerial Navigation.—Aircraft of the Allied and Associated Powers shall have full liberty of passage and landing over and in German territory, equal treatment with German planes as to use of German airdromes, and with most favored nation planes as to internal commercial traffic in Germany. Germany agrees to accept Allied certificates of nationality, airworthiness or competency or licenses and to apply the convention relative to aerial navigation concluded between the Allied and Associated powers to her own aircaft over her own territory. These rules apply until 1923 unless Germany has since been admitted to the League of Nations or to the above convention.

Rides for A. S. Recruits

Col. Rader, of Souther Field, has ordered that all men enlisting and sworn into the Air Service shall have an airplane ride upon reporting for duty. This is to acquaint the man with flying and to assist in deciding their fitness to be pilots.

All men receiving their discharge from the Service also are to have a flight if they desire.

Must Have a License

The Joint Army and Navy Board on Aeronautic Cognizance wishes to call attention to an occurrence of recent date, the seriousness of which must be apparent to every one.

On March 25, 1919, during the parade held in celebration of the home coming of the 27th Division in New York City, a flying boat was seen in flight directly up and down Fifth Avenue above the parade, at a dangerously low altitude estimated to be from three to five hundred feet, which was so low that in case of motor failure the pilot would have had no choice except to land in the crowd on the Avenue. He could not have reached even a fringe of Central Park owing to the number of trees.

Inquiry has developed that this boat was piloted by a civilian who was flying without the license required by the Proclamation of the President of the United States on February 28, 1918. This proclamation provides that a license must be obtained from the Joint Army and Navy Board on Aeronautic Cognizance by or in behalf of any person who contemplates flying in a balloon, airplane, seaplane, or other machine or device over the whole United States, its Territorial Waters, Insular Possessions, and the Panama Canal Zone. Heavy penalty is attached to violation of this regulation.

There is no way of adequately providing for the public safety where airplanes fly at too low an altitude over cities or large assemblies of people. In case of accident a pilot would be forced to descend immediately, and human life and property would be endangered to a serious degree. All persons operating civilian aircraft are cautioned against the repetition of an occurrence such as the one which took place in New York on March 25, and are warned that before engaging in the operation of any airplanes or balloons, they must first secure a license from the Joint Army and Navy Board on Aeronautic Cognizance.

"THE SHARK," FIGHTING BOMBER

L-W-F ENGINEERING COMPANY, Inc.

COLLEGE POINT, L. I.

Southeastern Aeronautic Congress

(*Continued from page* 6)

RESOLVED: That the municipalities represented in this Southeastern Aeronautical Congress, and all others interested, prepare at once to establish landing fields according to plans approved by Federal authorities and that the War and Navy Departments be authorized and instructed to supply to these cities out of the surplus material on hand, such equipment as is justified and needed by the type of field provided, together with the assignment of Federal instructors to these fields, so that reserve pilots may be trained, and be it further

RESOLVED: That this Southeastern Aeronautical Congress place itself formally on record as committed to aeronautical development, that it offers all assistance possible to representatives in Congress and municipalities, and that it present copies of this resolution to the Southern Association of Commercial Executives, the National Association of Commercial Executives and to the Chamber of Commerce of the United States, recognizing that all commercial and civic bodies unite at once in a movement to develop aerial navigation, believing that such a course is vital to the future prosperity, safety and welfare of our country.

With General Menoher's landing field plan Major Hickam gave out the following agreement into which the Government is willing to enter with municipalities:

AGREEMENT FOR LANDING FIELDS
Between
UNITED STATES GOVERNMENT AND ——

These articles of Agreement, entered into this —— day of ——, 1919, by and between the City of ————, a corporation hereinafter called the "Municipality" and the United States Government, hereinafter called the "Government," represented by ————, Air Service of the United States Army and by ————, Postoffice Department of the United States, acting under the direction of the Secretary of War and of the Postmaster General respectively, witnesseth:

WHEREAS, It is in the interest of the development of the Air Service of the Army and of the Aerial Mail Service of the Postoffice Department for the United States Government to cooperate with various municipalities in establishing landing fields at various suitable points in the United States, and

WHEREAS, It is to the interest of the said municipalities to establish within their limits places where frequent and safe landings may be made by Aerial navigators,

WHEREAS, It is desirable that such landing fields be as uniform and standardized as possible in location, construction and equipment.

NOW, THEREFORE, In consideration of the mutual agreements herein contained, the parties hereto have agreed and by these presents do agree to and with each other as follows: *viz.*

ARTICLE I

The Municipality agrees to lay out and construct within its limits a landing field at such place and in such manner, as may be approved by the Government's representatives in accordance with the Government's specifications which are hereto attached, marked Exhibit "A."

ARTICLE II

The Municipality agrees to maintain the said Field at its own expense, to keep it in good condition so that safe landings may at all times be made theron and to employ and hire all necessary personnel for the proper operation and care of the said field.

ARTICLE III

Except as otherwise herein provided, the Municipality agrees to provide, install and maintain such equipment, apparatus and tools for the said fields as may be necessary and as shown upon the list attached hereto marked Exhibit "B."

ARTICLE IV

The Government agrees to provide all the material necessary for the erection by the Municipality of one expeditionary steel hangar.

ARTICLE V

The Government agrees when such field has been laid out and equipped and approved by its representatives, to designate the same as an official United States Landing Field.

ARTICLE VI

The following additional matters are mutually agreed upon by the Government and the Municipality:

IN WITNESS WHEREOF, the Municipality has caused this agreement to be executed by its proper officers thereunto duly authorized, and the Government has caused it to be executed by the undersigned, duly authorized officer and representative.

....
(Municipality)
By ....
United States Government
By ....
Air Service
....
Postal Department

Airplane Forest Patrol

Patrol of National Forests by army airplanes to give early warning of fires developing in the forests will begin June 1, according to arrangements completed with the War Department by the Forest Service, United States Department of Agriculture.

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Mr. Curtiss Has Faith In the NC Boats

(*Continued from page 5*)

against a cross wind. They would fly at 71 miles per hr. in order to sustain their lead of 28,000 pounds, and would gain from the wind three miles an hour, flying 222 miles at the end of the first three hours. The next three hour period would find them with a wind directly on their tails, going at a speed of 70.5 miles, raised to 100 miles an hour by the wind. The sixth hour would thus find them 522 miles out. From that point on the winds would be favorable. Making from 99 to 95 miles an hour, the aeroplanes would swing slightly to the southeast for the first nine hours, and would then change to an almost due east course to take advantage of changing winds, swinging again to the southeast at the fifteenth hour of flight. Flying this course they would arrive at the Azores."

It would be possible, Mr. Curtiss pointed out, for the fliers to steer directly for the Azores, allowing for drift. This would not be as economical a procedure as the one just described, but might be preferred on account of its simplicity.

As the Azores route follows for a considerable distance the course of transatlantic steamships passing between the United States and Europe these vessels will join with the destroyers and dreadnoughts on duty in eliminating chances of disaster to the seaplanes. The NC boats can ride on a fairly high sea, make repairs and ascend again. Mr. Curtiss states that one of the engines will be held in reserve after the ship gains in altitude on the start of the flight, and another also will be idle after the first fourteen hours, when the seaplanes will be light enough to fly easily on two motors.

Mr. Curtiss it will be remembered was the constructor of the flying boat America, in which in 1914 Lieut. Porte intended to cross the Atlantic. The America's trip was cancelled when the war broke out in August, 1914, recalling Lieut. Porte to service in the British navy. British flying boats have been modelled on the America and the present NC planes may be considered an outgrowth of the 1914 Curtiss model, the first multi-motored flying boat to take the air.

Continuing Engine Work

The plant of the Sturtevant Airplane Co. at Jamaica Plain, Mass., has been sold to a manufacturer in another line. This does not mean that the Sturtevant name will be withdrawn from aeronautics, as the B. F. Sturtevant Co. of Hyde Park, Boston, is continuing its development work on aircraft engines.

The company is now working on a device which if successful will prove the next great forward step in engine efficiency, power and speed.

The technical aircraft staff of the airplane company has been taken over by the B. F. Sturtevant Company and will be available for aircraft development when the company decides to supplement its aircraft engine work again with an aircraft plant.

Airdrome for Geneva

If there is a League of Nations, its first meeting in Geneva as the capital will be held in the famous Alabama Hall of the City Hall, it is learned.

The local authorities have been notified that a site one and one-half miles square on the lake shore will be required for the permanent home of the League, and several such sites have been offered by old families of Geneva.

The most powerful wireless station in the world will be constructed here, and also a huge airdrome for diplomatic airplanes, all of which will be extraterritorial. The local authorities are giving every assistance.

Answers to Correspondents

All bona fide inquiries will be answered by letter to the inquirer and included in these columns. Questions should be accompanied by stamped addressed envelopes.

C. E. H.—There are various flying schools in which flying is taught and students are instructed in the mechanism of the engine and plane, but there are no schools giving regular ground school work together with flying instruction.

J. P. D.—According to the latest decision of the British Air Ministry, the British "Ace of Aces" was the late Major Edward Mannock, who brought down 73 German airplanes, just heading Lieut. Col. William A. Bishop, the Canadian aviator. Of all the Allies, Lieutenant Renee Fonck, the French ace, holds the record with seventy-eight. The late Baron Richtofen of German "circus" fame claimed to hold the world's record for the number of machines he had destroyed, but the Germans worked on a different system respecting official confirmation of each victory, and his record has not been confirmed. Major Mannock was born in India of British parents thirty years ago and was considered the greatest aerial tactician whom the Royal Air Force produced.

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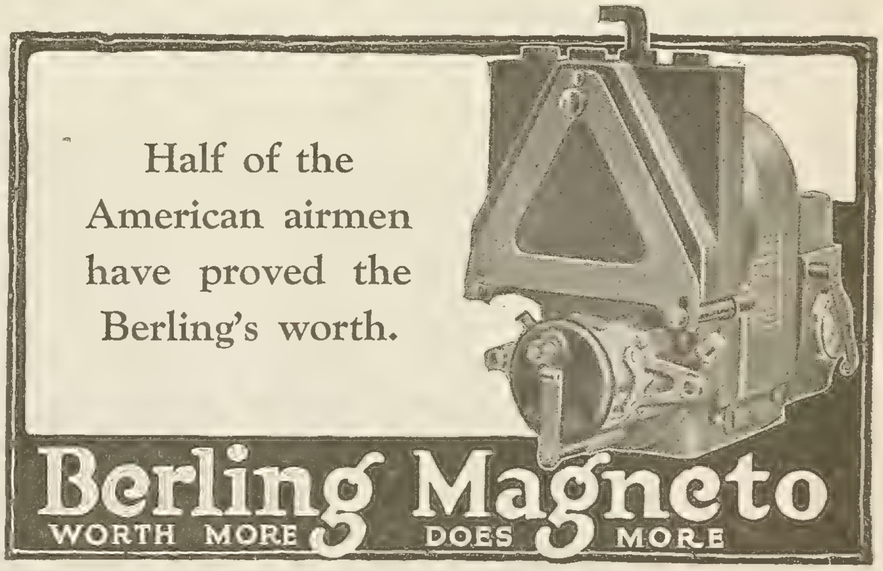

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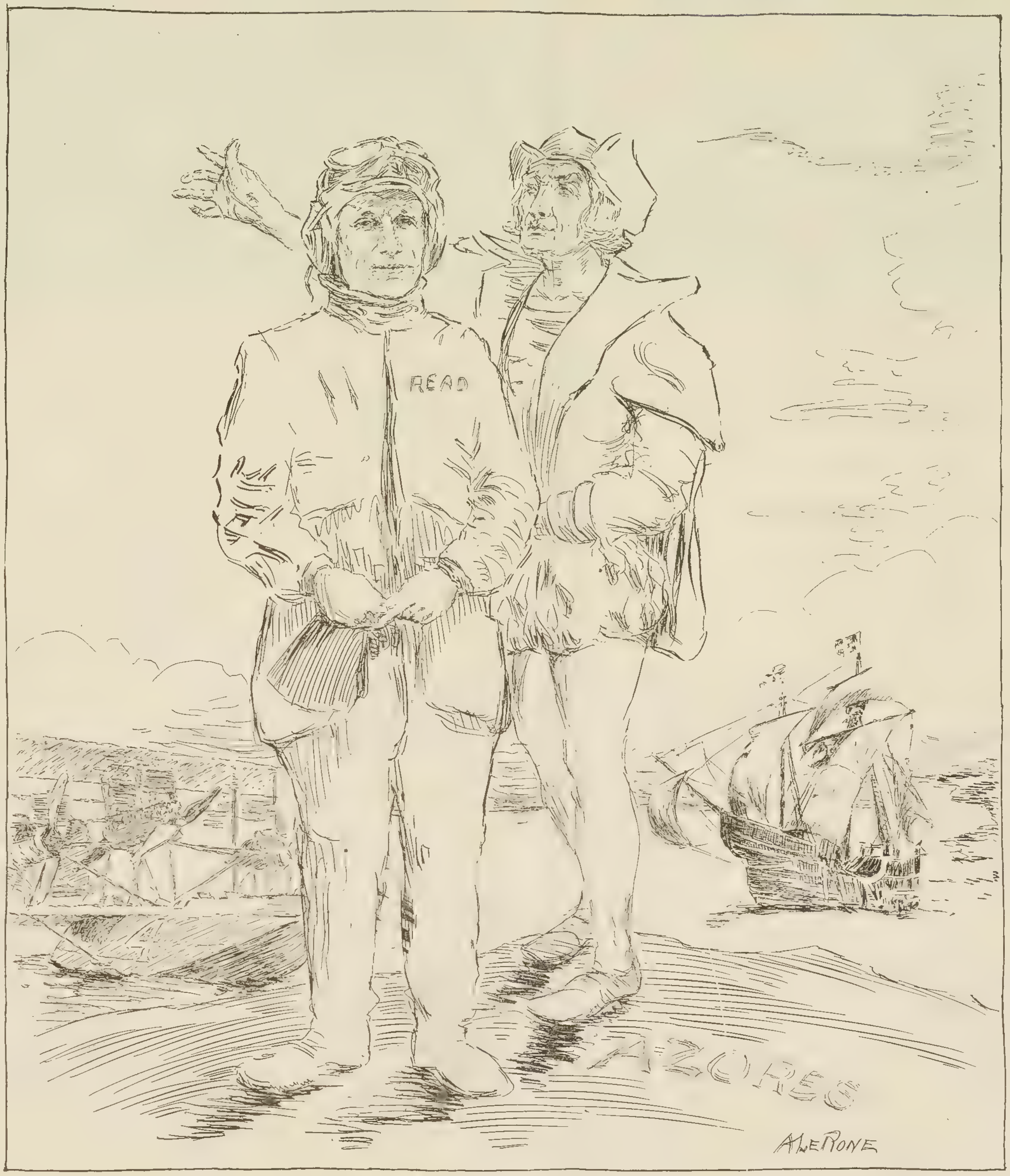

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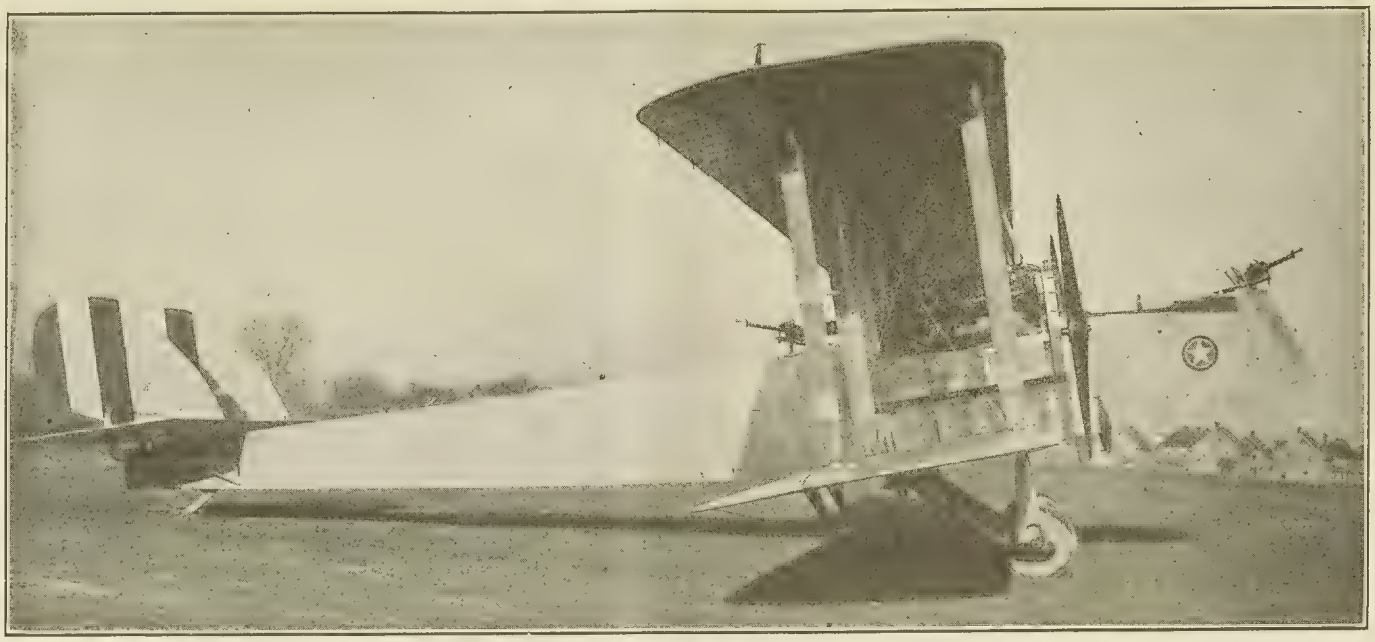

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NC-4's Great Flight to the Azores

Awaiting Favorable Weather to Continue the Trans-Atlantic Trip to Lisbon, Portugal

MAY 2[illegible]19
Office Library

As this issue of AIRCRAFT JOURNAL goes to press the NC-4 is resting in the harbor of Ponta Delgada awaiting favorable weather for the flight to Lisbon, Portugal.

On May 22 Commander Towers cabled the Navy Department as follows:

"3.15 a.m.—Have ordered Commander Lavender and Lieut. J. S. Sadenwater to take passage on Government vessel to United States and report to Bureau Navigation. Have ordered Boatswain Moore to return to New York on the Melville, in charge of parts of NC-3. Recommend that NC-3 be placed out of commission and NC-1 be stricken from Navy list. Commander destroyer force has placed Stockton at my disposal. Request authority to proceed with the remainder of personnel of NC-1 and NC-3, by Stockton, to Plymouth, England, to join U. S. S. Aroostook, as accounts and effects of personnel are on that vessel. TOWERS."

The Navy Department Thursday morning, May 22, received the following message from Admiral Jackson at Ponta Delgada:

"NC-4 will not leave today. Seas too rough for start."

The wrecked plane NC-3 has been brought in to the beach, where it is being dismantled, preparatory to shipment to the United States.

Summary of the Naval Atlantic Flight

(EASTERN TIME—LAND MILES)

Name of Seaplane	Left Rockaway	Arrived Halifax	Left Halifax	Arrived Trepassey	Left Trepassey	Arrived Horta	Left Horta	Arrived Ponta Delgada
NC-1	May 8 10 A.M.	May 8 7.10 P.M.	May 10 6.16 A.M.	May 10 1.36 P.M.	May 16 6.11 P.M.	§		
NC-3*	May 8 10 A.M.	May 8 7 P.M.	‡May 10 11.30 A.M.	May 10 6.20 P.M.	May 16 6.02 P.M.	...	...	‖
NC-4	May 8 10 A.M.	May 14 †2.05 P.M.	May 15 8.52 A.M.	May 15 7.08 P.M.	May 16 6.04 P.M.	May 17 9.25 A.M.	May 20 8.40 A.M.	May 20 10.24 A.M.

Distance in land miles:—Rockaway to Halifax, 621; Halifax to Trepassey Bay, 529; Trepassey Bay to Horta, 1380; Horta to Ponta Delgada, 172; Ponta Delgada to Lisbon, 920; Lisbon to Plymouth, 891. Total, New York to Plymouth, 4514.

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* Flag-ship. † Delayed at Chatham, Mass., by engine trouble. ‡ Delayed by broken propellers.

§ Forced down by fog off Flores Island, 200 miles from Horta. Crew picked up by steamer Iona. Plane abandoned.

‖ Forced down by fog 300 miles from Corvo. Came into Ponta Delgada under her own power after sixty hours on the water.

The Navy Department on May 20 received the following message from Commander Towers at the Azores:

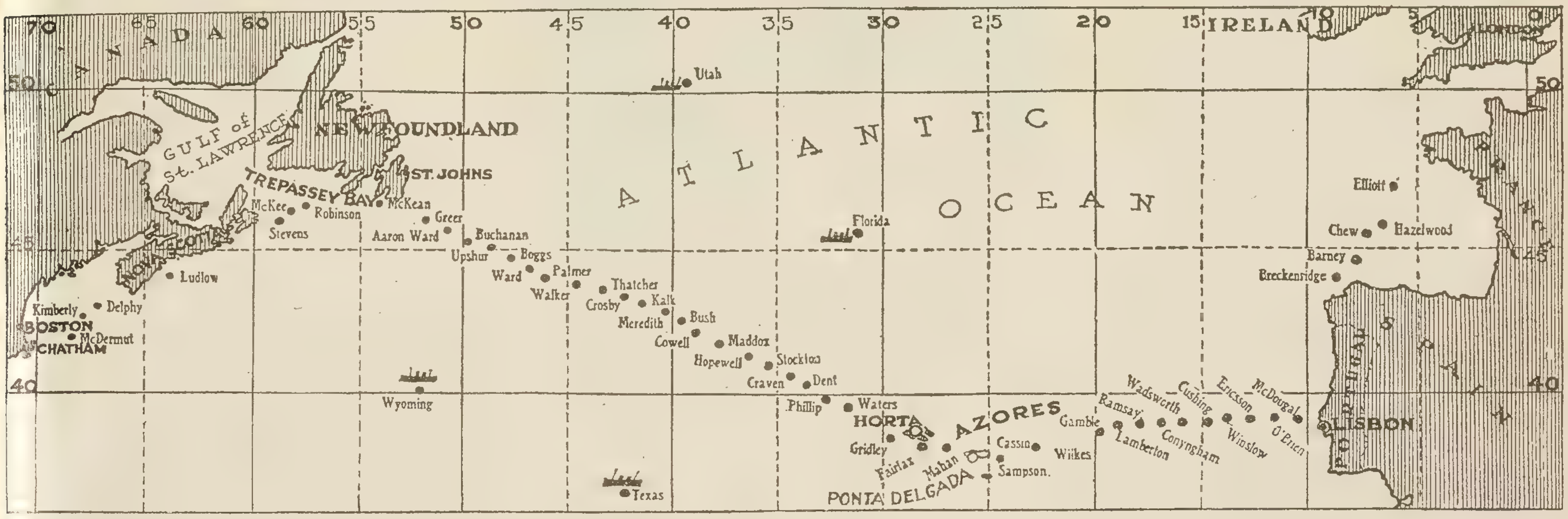
"General summary of situation is as follows:

"NC-1 sank at sea; all personnel rescued.

"NC-3 at moorings in Ponta Delgada in very badly damaged condition; both lower wings wrecked, wing pontoon gone, tail badly damaged, hull severely racked and leaking badly. Is being disassembled and will be shipped to New York.

"NC-4 at mooring at Ponta Delgada in excellent condition and will proceed to Lisbon as soon as weather permits.

"All personnel in excellent condition; all very minor casualties to certain of NC-1 crew. (12:30 p. m. Washington time.)"



Location of Battleships and Destroyers Forming the Patrol Along the Route of the NC Boats

How Destroyers Patroled the Air Route

The approximate position of each of the twenty-one United States destroyers stationed fifty miles apart in the line of the transatlantic air flight between Newfoundland and the Azores, is shown by the following data, given out by the Navy Department. The table gives the latitude and longitude and name of the destroyer in each of the twenty-one positions corresponding to the numerals:

Group No.	*Station No.*	*Lat. N.*	*Long. W.*	*Destroyer.*	*In Reserve.*
	1	46-17	52-03	Greer	
	2	45-57	50-56	Aaron Ward	
1	3	45-37	49-50	Buchanan	Williams
	4	45-17	48-44.5	Upshur*	
	5	44-57	47-40	Boggs	
	6	44-37.5	46-35	Ward	
	7	44-18	45-31	Palmer	
2	8	43-58	44-27	Walker*	Laub
	9	43-38	43-23	Thatcher	
	10	43-18	42-20	Crosby	
	11	42-58	41-17	Kalk	
	12	42-38	40-15	Meredith*	
3	13	42-18.5	39-13	Bush	Foote
	14	41-58.5	38-11	Cowell	
	15	41-39	37-09.5	Maddox	
	16	41-19	36-07.5	Hopewell*	
	17	40-59	35-06.5	Stockton	
	18	40-39	34-06	Craven	
4	19	40-19	33-05.5	Dent	Roper
	20	39-59	32-05	Phillip*	
	21	39-40	31-07	Waters	

The Trip to Trepassey

The three planes left Rockaway, L. I., May 8, at 10 A. M., the NC-1 and 3 reaching Halifax about 7 o'clock the same evening. They proceeded to Trepassey on May 10, making fast time. The NC-4 was forced down off Chatham, Mass., by engine trouble, reaching that port under her own power on the morning of May 9, with the crew none the worse for the night on the ocean. After repairing her engines she proceeded to Halifax on May 14, flying at the rate of 99 miles an hour, and the following day continued on to Trepassey. She was compelled to land at Storey Head for repairs to the oil and gas lines. She resumed the flight at 11.47 (New York time). Her actual flying time for the 460-mile trip was 6 hours and 20 minutes, making her average speed 72.6 miles an hour.

The NC-3 made the best showing in elapsed flying time. After eliminating time lost through putting back to Halifax by the NC-3 and the time lost by the NC-4 at Halifax the showing in flying time between Rockaway Beach and Newfoundland for the three machines was:

ROCKAWAY TO HALIFAX
NC-1—9 hours 10 minutes.
NC-3—9 hours.
NC-4—7 hours 47 minutes.

HALIFAX TO TREPASSEY
NC-1—6 hours 56 minutes.
NC-3—6 hours 50 minutes.
NC-4—8 hours 59 minutes.

ROCKAWAY TO TREPASSEY
NC-1—16 hours 6 minutes.
NC-3—15 hours 50 minutes.
NC-4—16 hours 46 minutes.

One False Start

Unable to get rising speed on account of a stiff cross wind until out into rough water where a take-off was impracticable, the NC-1 and NC-3 made a vain attempt to start from Trepassey, N. F., late in the afternoon of May 15. The effort was abandoned just as the delayed NC-4 made a perfect landing.

The NC-1 and NC-3 were just moving back through the narrows for a new start when NC-4 was sighted, and her coming, coupled with the fact that the pilots of both departing planes were so wet from waves, whipped by a thirty-five-mile westerly wind, led Commander Towers, the expedition head, to decide not to send them into the air again.

The NC-1, commanded by Lieutenant P. N. L. Bellinger, taxied off down the harbor at 5:04 P. M., Halifax time (4:04 New York time), hoping for a getaway. The NC-3, Commander John H. Towers's flagship, followed eighteen minutes later, to the accompaniment of great cheering from the crews of the base flotilla and groups of Newfoundlanders on the shore.

A short time later, however, both reappeared, and came to a stop near the mother ships.

Off on the Big Hop

Just after 6 o'clock, New York time, Friday evening, May 16, the three great American seaplanes, NC-1, NC-3 and NC-4, took the air and started on the longest and most perilous leg of their transatlantic flight.

Before the long northern twilight was ended they had passed from the straining vision of watchers ashore, steering a true course for the distant Azores.

The start was made three hours later than had been intended to permit of completion of repairs and inspection of the NC-4.

It was shortly after 6 o'clock when, without ceremony, the planes cast off their moorings, the NC-3, Commander Towers's flagship, leading. The Four, commanded by Lieut. Commander A. C. Read, followed, and the One, in charge of Lieut. Commander P. N. L. Bellinger, formed the rear guard.

The Three nosed around toward the Narrows and taxied down the narrow stretch of Trepassey Harbor, which opens into Trepassey Bay.

The roar of the motors resounded from the steep shores, trumpeting the purpose of the Argonauts of the air, and every other activity of Trepassey Village and vicinity was suspended.

The newspaper men, watching from the shore with the natives, saw the NC-3 pass through the Narrows and head into the westerly wind. The roar of her engines redoubled as the throttle was thrown wide open. Presently she rose from the water and, circling for altitude, straightened out on her southeastward course.

A moment she seemed to falter, as if to make sure that the others were coming. But only two minutes elapsed before the NC-4, in the running for the finish, following the same tactics, rose and followed the flagship.

A little more difficulty was experienced by Commander Bellinger's ship, the One, in getting away with her load. She also took off, however, seven minutes after the Four.

It was then that the Three, satisfied that the rest of the squadron was fit, put away in the direction of Europe. The west wind, which had kicked up a troublesome chop at the start, was not pure velvet—so much speed added to what the motors and propellers gave. The time of getway for the three planes was as follows:

NC-3—7.32 Newfoundland time, 6.02 New York time; NC-4—7.34 Newfoundland time, 6.04 New York time; NC-1—7.41 Newfoundland time, 6.11 New York time.

Silence of Awe Marks Great Flight

A strange silence fell over the bay and its shores as the roar of the seaplane motors dwindled to nothingness. Something they could not define seemed to have passed out of the lives of the little watching groups.

It was a moment for cheers, but no cheer was heard. Instead, every eye was fixed on the big flying boats, their cream colored wings flashing in the sun, and every heart seemed with the men who were handling them.

Copyright Underwood & Underwood

View of Lisbon Harbor

Not until they were mere specks against the eastern sky, in which already the night was gathering, did the spell the departure of the boats had cast over the spectators lift. Then some one started a cheer. It was taken up by every throat, the natives joining with the Yankee sailors and the newspaper men in their belated godspeed. As it died out, the planes passed beyond view of even the long visioned fishermen.

NC-4 Reaches Horta

The NC-4 arrived at the Port of Horta, in the Azores, at 1.25 P. M. Greenwich time (9.25 A. M. New York time, May 17), having made the flight from Trepassey in 15 hours and 18 minutes.

The Four first sighted land at Flores, at 11.35 A. M. The NC-1 then was close behind her. The NC-3 passed Station 17, the destroyer Stockton, at 9.15 o'clock.

The first two seaplanes were in wireless touch with the torpedoboat tender Melville, off Ponta Delgada, shortly before noon.

The NC-1 reported at 1.40 P. M. Greenwich time (9.40 A. M. New York time) that she had gone off her course and had been forced to alight in the open sea 200 miles northwest of Fayal. Four destroyers went to her assistance.

This cablegram from Horta was received in Washington about 9 P. M. Washington time:

"NC-1 forced to land at 8.19 A. M. Washington time near Corvo. NC-4 at Horta. Last news of NC-3 at 5.14 A. M., when she asked for compass signals near station 18. Destroyers now searching for both planes. Destroyer Harding in position latitude 39 degrees 50 minutes, longitude 30 degrees 55 minutes, on course 289. (This course located her just southeast of the island of Flores), speed 22 knots, reports hearing NC-1 signals at 4.27 P. M. Washington time. Signals getting stronger as approaching"

Long Flight in 15 Hr. 18 Min.

Neither the blackness of night over the Atlantic nor an unexpected bank of thick fog shrouding the tiny, scattered Azores could prevent the NC-4 from successfully completing the longest and critical lap of the aerial passage of the Atlantic Ocean.

Flying at ninety land miles an hour, an average she maintained during her fifteen hours and thirteen minutes in the air, she split her way through the fog, straight as a speeding bullet, and dropped easily down upon the waters of the harbor of the port of Horta, on the island of Flores, where the American naval vessel Columbia was waiting to welcome her at 9.25 A. M., New York time (1.25 P. M. Azores time).

Her average altitude was 800 feet, but at times reached 1800 feet.

Possibly it was the fact that the NC-4 narrowly escaped being left ingloriously behind as a hoodoo ship, unworthy of the high enterprise, at Trepassey that sent her roaring through the mist, miles ahead of the flagship NC-3 and the veteran, unfailing NC-1.

Commander Towers's Report

At 1.30 o'clock on the morning of May 20 the Navy Department made public a brief report from Commander J. H. Towers, Commander of the NC-3, which reached Ponta Delgada at 1.50 P. M. Monday, under her own power.

The report indicated that the Three was considerably damaged when she landed on the sea, and could not again take the air. Commander Towers's despatch follows:

"Arrived Ponta Delgada 17.50 G. M. T. (1.50 P. M. Washington time), May 19; compelled to go above clouds at Station 8 on account of failure of light on the pilot's instrument board and necessity of having heavenly bodies for reference. Last destroyer sighted No. 13. Came through clouds at daybreak, but missed Destroyer 14.

"Believe thrown off course by high velocity of upper winds, but laid parallel course. Encountered heavy rain squalls 7.45 G. M. T. (3.45 Washington time), May 17, which continued until 13.30 G. M. T. (9.30 A. M. Washington time), when weather cleared and we decided to land to make observations. We had only two hours' fuel left.

"Discovered heavy sea running too late to remain in air. Slightly damaged hull and seriously damaged forward centre engine; struck on landing, which made it impossible to leave water.

"Observations showed this position to be 47.45 north, 30.25 west. (Apparently this should be latitude 37 instead of 47, as given in the despatch.) Gale arose on evening of 17, which was ridden out successfully until 9 G. M. T. (5 A. M. Washington time) May 19, when lost port wing pontoon. Seaplane suffered severely, but succeeded in riding out gale, and, by sailing a total distance of 205 miles, made moorings at Ponta Delgada under own power

(*Continued on page* 14)

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American Air Commission En Route to Europe

Assistant Secretary of War Benedict Crowell and Others Sailed on the Mount Vernon, May 22

Photo by N. Lazarnick
S. S. BRADLEY
Manufacturers' Aircraft Association

Benedict Crowell, Assistant Secretary of War, and a number of military and civilian aviation experts are going to Europe to study possibilities of developing the science of aviation along the lines of civil usages.

Mr. Crowell also will collect all available information regarding aviation which might be of value or benefit to Congress during the coming session.

The party sailed from New York on May 22.

HOWARD E. COFFIN
Council of National Defense

Included in the party are Lieut. Col. James A. Blair, of the general staff; Capt. Harry C. Mustin, U. S. N.; S. S. Bradley, of the Manufacturers' Aircraft Association; G. H. Houston, President of the Wright-Martin Aircraft Corporation; C. M. Keys, Vice President of the Curtiss Aeroplane and Motor Corporation, and Howard Coffin, of the Council of National Defense.

Col. Halsey Dunwoody, Chief of the Air Service overseas, will join the party in France

Objects of the Commission

The following verbal and informal statements were made by the Secretary of War:

"You perhaps know that Mr. Crowell is going abroad, sailing on the twenty-fourth. I am rather anxious to have you know why he is going, and the general purpose of his trip. In order to make the experience of the War Department as available as possible to Congress and the country, we are trying in every direction to round up our experience and to have in definite form all that we can learn about the things that Congress is likely to be interested in. Mr. Crowell is going over to get all the inforamtion he can on the subject of aircraft—the military use of aircraft, civilian possibilities of aircraft, modes of promotion, and aircraft development and manufacture which are under advisement abroad; the rules of aerial navigation which are under consideration, and standardization so far as they are possible in so new an industry.

(C) *Underwood & Underwood*
BENEDICT CROWELL
Assistant Secretary of War

"Mr. Crowell is taking with him a group of men who are especially qualified, as he and I think, to get this inforamtion from all points of view. His chief reliance will be Col. Halsey Dunwoody, who is already in France and is the Chief of the Air Service Supply. Colonel Dunwoody was for some years an instructor at West Point, a man of high scientific attainments, and is in France now. Capt. Harry C. Mustin will represent the navy. Mr. Crowell is also taking Lieut. Col. James A. Blair, Jr., of the General Staff, and the following civilians: S. S. Bradley, of the Manufacturers' Aircraft Association; G. H. Houston, President of the Wright-Martin Aircraft Company; C. M. Keys, Vice-President of the Curtiss Airplant Corporation; Howard Coffin, of the Council of National Defense, and will probably add to this list a lawyer skilled in Admiralty Law since there is a certain analogy between the law of aerial navigation and sea navigation.

GEORGE H. HOUSTON
Wright-Martin Aircraft Corp.

(*Continued on page* 20)

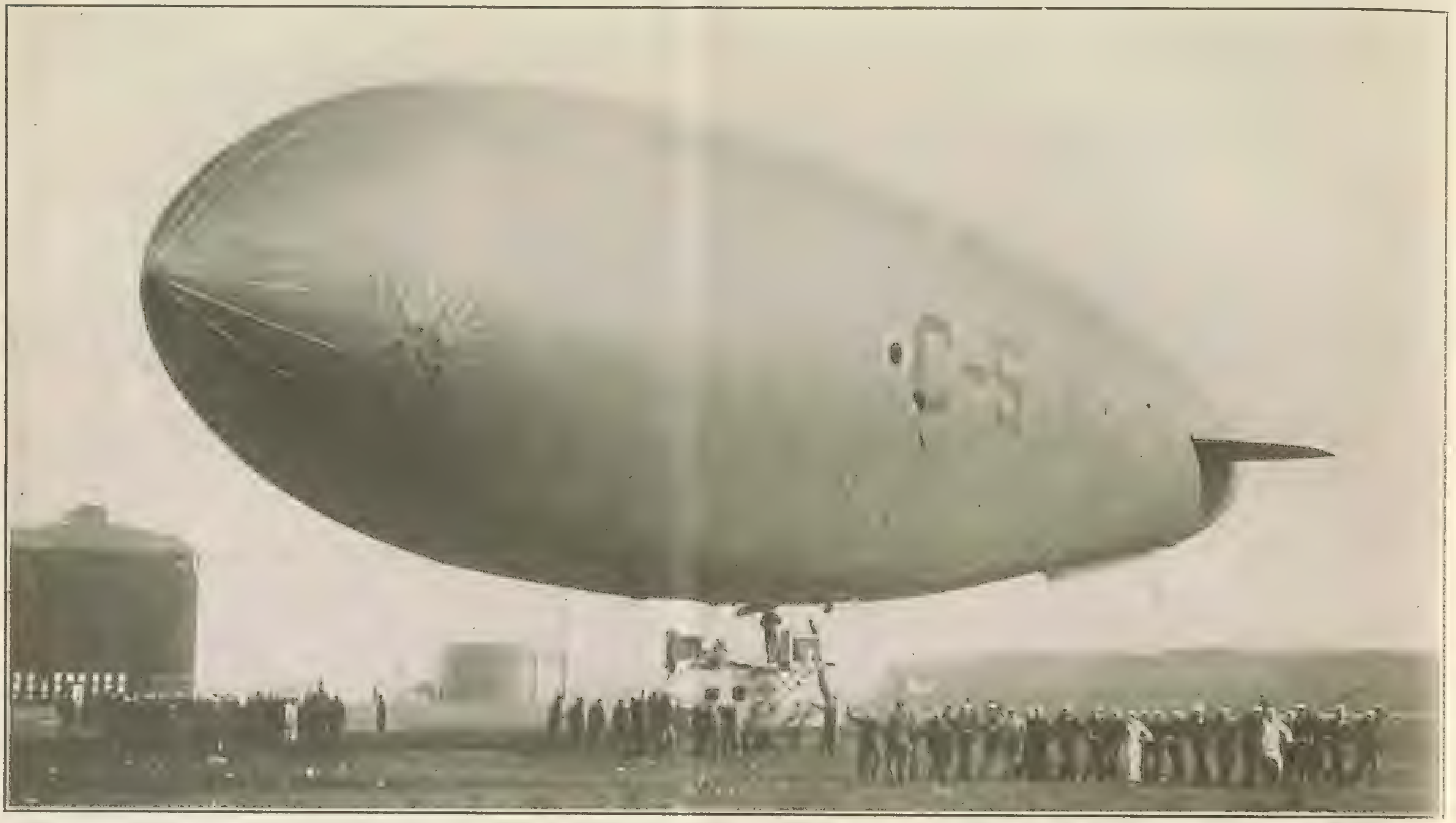
C. M. KEYS
Vice-President Curtiss Aeroplane & Motor Corp.

Navy C-5 Makes a Splendid Flight

From Montauk to St. Johns in 25 H. 40 Min. and Then Is Blown Seaward from Her Moorings

The C-5 arrived at the Pleasantville base, near St. Johns, N. F., at 9:45 a. m., May 15, New York time, from Montauk Point, Long Island, after being in the air continuously for twenty-five hours and forty minutes.

A perfect landing was made within the narrow confines of the old cricket field which was chosen as the anchorage for the airship. Lieut. J. V. Lawrence was at the wheel at the completion of the voyage, and the manner in which he handled the ship while the landing was being performed evoked a cheer of admiration from the crowd which had gathered.



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U. S. Navy Dirigible C-5, which flew May 14 from Montauk Point, L. I., to St. Johns, N. F., and was then blown to sea in a gale

As soon as she had been secured at her anchorage a big force, under Lieutenant Little, was set to work preparing the ship for the transatlantic flight. It was not long before the treacherous wind began to play upon the dirigible, and early in the afternoon she was torn from her anchorage, but was recaptured and secured again.

Immediately after arrival, Lieutenant Commander Coil and his crew got out of the car and prepared to take twelve hours sleep before continuing their flight across the Atlantic. Before turning in, however, he told the story of the trip to Newfoundland.

In it he gave all the credit to Lieutenant Campbell and Lieut. J. V. Lawrence, both of whom, he said, were weary "and almost seasick," but stuck to their posts. He also described the period of several hours during which the airship was "lost" over Newfoundland.

"We made a 'landfall' at St. Pierre," he said, "but found ourselves on the west instead of the east shore of Placentia Bay. From this point we attempted to follow the Chicago's radio directions, but they did not work. For the moment we were lost.

No Trouble from Fog

"We started 'cross lots' and saw about all of Newfoundland, and I must say that this is the doggondest island to find anything on I ever struck. Eventually we hit the railroad track and followed it to Top Sails, which we identified, and then continued on to St. Johns. There was considerable fog, but it did not trouble us.

"Throughout the time we were trying to find ourselves we had difficulty with our wireless set, and part of the time it was out of commission.

"Our troubles started just after midnight, when the sky became overcast. Before then we had been flying under a full moon at an altitude of 1,000 feet. We lost our bearings while approaching Little Miquelon Island, off the south coast of Newfoundland, about 170 miles from St. Johns."

Commander Coil praised the work of the landing crew which moored the dirigible. Rear Admiral Spencer S. Wood, commander of the aviation base, greeted the C-5's commander. The entire crew of the airship then took an automobile, and were hurried to the Chicago, where they took breakfast and turned in for a much needed rest.

Burst from Her Moorings

The wind continued blowing furiously and finally the Blimp burst from her moorings in a gale and was swept out to sea soon after she had arrived from Montauk Point, after being in the air continuously for twenty-five hours and forty minutes.

The destroyer Edwards immediately set out in pursuit, with orders to bring the big gas bag down with anti-aircraft artillery if necessary.

Lieut. Charles G. Little of Newburyport, Mass., who had charge of the C-5 after her crew had been bundled off to bed aboard the cruiser Chicago, was almost carried away by the fugitive gas bag while making a nervy but futile attempt to deflate it.

Seated in the Blimp when she broke away, he seized the rip cord and gave a tug which should have opened up the big envelope and permitted the gas to escape. The cord broke, however, and Lieut. Little, realizing that he would be unable to bring the ship down, leaped out from a height of twenty-five feet. His only injury was a sprained ankle.

The escape of the C-5 followed a long struggle by sailors from the cruiser Chicago to prevent its injury when gusty west winds swept across its mooring place in Quidi Vidi Basin and began tossing it about. Several of the sailors, clinging to guy ropes, were thrown down by the dirigible's final tug, but none was injured.

A landing crew of 100 men under the direction of Lieutenant Little had fought with the gale for control of the C-5 for six hours before it broke away.

Vain Attempt to Save the Ship

Wholly unsheltered on the wind swept field, the dirigible pitched and bucked, stripping her bottom of canvas. Fenders were placed to blunt the shock, and the men of the landing crew rode wildly as they clung to the car through its oscillations under succeeding gusts of wind, endeavoring to save it.

Several of the guy ropes snapped and were replaced, but for hours the cables held, and it was believed the ship would be saved. Then the wind rose from thirty miles an hour to forty. The landing crew was considering letting the Blimp ride out the gale at the end of extended lines when the rigging on the nose of the nacelle gave away and it was decided to deflate the envelope.

Mechanics who were working on the engines were ordered to abandon ship and all but Lieutenants Little and R. A. D. Preston and Chief Machinist's

Mate J. J. Crampton went overside. As the ship continued to buck, Lieutenant Little ordered the other two to leave. He was endeavoring meanwhile to pull the rip cord and deflate the envelope.

Thrashed wildly by the wind, the gas bag rebounded, and every stay snapped. Lieutenant Little gave another tug at the rip cord and it broke. He leaped from the ship with the end of the rope in his hand as the big bag rose and soared off over Kings Hill, northeast of the field and just north of Cuckolds Cove, whence it had entered a few hours previously.

When last sighted from shore, the C-5 was disappearing toward the northeast.

The dirigible might have been saved by starting her engines after she had torn herself free, but for the fact that the mechanics had been interrupted in their overhauling of the ship by the storm and the propellers were unsecured, so that an attempt to start the engines would have thrown them off.

The log of the airship was saved by Chief Machinist's Mate Crampton as he leaped overside before it broke away.

Photo Keystone Photo News

Crew of the Dirigible C-5 (from left to right) Commander E. W. Coil, (Commanding pilot); Lieut. J. V. Lawrence (pilot); Lieut. H. M. Easterley (Radio Operator); Ensign D. P. Campbell (2d Assistant Pilot); Chief Machinist Mate T. L. Noorman (Engineer) and Chief Machinist Mate S. H. Blackburn (Engineer)

Departure from Montauk

The C-5 left Montauk Point, L. I., at 8 a.m., May 14. The secrecy with which the preparations had been made enhanced the spectacular getway, witnessed by only 100 "gobs" and officers and twoscore fishermen.

At 7 o'clock Lieutenant Commander E. W. Coil of Marietta, Ohio, the dirigible's skipper, came from the wireless station waving the good news message in his hand.

The engineers, Chief Machinist's Mates G. H. Blackburn and T. L. Mooreman, warmed up the motors and then ran them up separately. It was found that revolutions, oil pressure, and water temperature were satisfactory. Ten thermos bottles of coffee and drinking water, ten pounds of chocolate, a box of sandwiches and enough medicine to constitute the craft as a seagoing ship were put aboard. The signal was given and the crew put on their fur-lined leather uniforms and climbed to their places.

The car, forty feet long, is a roomy carriage suspended about eighteen feet below the big envelope. Ensign E. O. Campbell of Lynn, Ky., the directional pilot, occupied the coxswain's seat in the bow of the boat. It is his duty, merely by aid of a marine compass to keep the ship on its path and steer in the horizontal plane. Lieut. J. B. Lawrence of St. Paul, Minn., occupied the pilot's seat beside the Commander, and the two of them navigate and change the elevations of the balloon to find the most favorable winds. The engineer's station is in a hole cut in the boat's turtle-deck just aft of the pilots. Between the gas tanks and the extreme aft and the engineers is the radio operator's seat, which was filled by Ensign M. H. Esterley of Youngstown, Ohio. All parts of the ship, including the engines on each side of the hull, can be reached by means of communicating gangways.

At a signal given by Commander Lieut. Raymond Norris, the dirigible officer at the station, fifty "gobs" guided the Blimp from the hangar.

And like a graceful bubble the big balloon left the pipe-shaped hangar and was off. A shout went up from the spectators as the big "cigar" headed into the wind, and then, turning on its own axis, pointed straight with the wind, bound for St. Johns, Newfoundland.

Power Equipment

The principal feature of the C-5 is the surprisingly small amount of gas consumed by its two engines. They are 125 hp. Union motors, 6 cyl., of the vertical type, and develop only 25 hp. less than the "V" shape Hispano-Suiza motors used on the dirigible C-4 at Rockaway Beach.

The gasoline tanks carry about 250 gal., and the motors use about 10 gal. p. hr. when they are running full. As far as fuel is concerned the Blimp is estimated to be able to travel 1,250 m. in still air at high speed, which gives a margin of 275 m. in the flight to St. Johns. On the overocean voyage the engines would not be raced. Calculated under the most favorable conditions the craft could travel as long as it could remain afloat in the air, or 70 hours. Under normal conditions the only way in which it would start out on a flight, the dirigible can do considerably more than 2,000 miles with the engines feeding freely.

Photo Keystone Photo News

Carriage of the C-5 Showing Positions of (1) Commanding Officer; (2) Pilot; (3) Radio Man

Lieut. Ralph Norris, an expert on the heavier-than-air craft motors, said:

"The engines on the C-5 are the most economical built. They have recently undergone some wonderful tests in Washington, and it was found that this type motor is almost impossible to wear out. If it is only up to the motors they will carry the Blimp wherever she is sent, for there are ways of alternating the engines which would keep the craft propelled for sixty hours in still air at a speed of thirty miles an hour."

Another feature of the C-5 is the wireless apparatus. The antennæ of the wireless is inside the gas bag and the power of the set enables the operator to send a message to any other ship or station within 150 miles. Messages from a greater distance may be read by the operator. In addition, aerial wires are strung from the stern of the boat to the rudder tail, and the boat also is equipped with a wireless telephone.

"Blimp" Howled

One of the most earnest watchers of the craft as she set off on her long journey was "Blimp," the mascot of the station, named after the type of aircraft. It has been the custom of "Blimp" to run from the air station to the shore, more than 400 yards away, to see that his naval friends in the airship got safely started on their journey. He remains on the shore until the dirigible returns to its hangar.

"Blimp" ran to the shore with the airship and beat it there by several minutes. As the big craft drifted over him he leaped into the air and barked his farewell, and then sat down on the beach to await the return. None of the sailors could make "Blimp" understand that his colossal companion had gone on a longer journey than it had ever taken before, and he remained on the beach until after nightfall, when hunger and lonesomeness forced him to seek food and companionship in the barracks.

One sailor declared that "Blimp" howled while he was on the beach.

After a long search for the C-5 by the destroyer Edwards, the dirigible finally was abandoned as lost.

She was inflated with the hydrogen used for long distance flights.

NC Boats Were Built to Fight Submarines

Official Statement Concerning the Inception and Construction of the Trans-Atlantic Flying Craft

Acting Secretary Roosevelt of the Navy authorizes the following:

The Navy Department makes public the following account of the inception and construction of the Trans-Atlantic flying boats, the NC-1, NC-3, and NC-4:

The first step in connection with the provision of the large flying boats now being used by the Navy for the Trans-Atlantic flight was taken by Rear Admiral D. W. Taylor, Chief Constructor of the Navy, on August 25, 1917, in a memorandum to Naval Constructor J. C. Hunsaker, U. S. N., his assistant for aeronautics, as follows:

"The United States motor gives good promise of being a success, and if we can push ahead on the aeroplane end, it seems to me the submarine menace could be abated, even if not destroyed, from the air.

"The ideal solution would be big flying boats or the equivalent, that would be able to keep the sea (not air) in any weather, and also able to fly across the Atlantic to avoid difficulties of delivery, etc.

"Please think it over very carefully, particularly as to the method of procedure to develop something as close to the ideal as possible."

Admiral Taylor's Foresight

Upon receipt of this memorandum, which initiated the project, studies were immediately undertaken to apply in a large seaplane the "United States Motor" referred to. This motor was at the time the subject of considerable controversy, but Admiral Taylor, as a member of the Aircraft Board, was in a position to weigh the evidence and to foresee the ultimate success of the new motor which was later to become famous as the "Liberty" motor. Admiral Taylor, after discussion of the problem, directed the preparation of tentative plans to show in a preliminary way the size and nature of a design of large flying boat to combine the maximum of seaworthiness consistent with sufficient endurance to fly across the Atlantic to the Anti-Submarine operating bases in France and England and to be capable of carrying heavy depth charges and a large battery of machine guns covering every angle of fire. It was anticipated that the boats would be attacked in the air by enemy aircraft.

Collaborators

On September 9, Glenn H. Curtiss of the Curtiss Aeroplane and Motor Corporation of Buffalo, was requested by wire to come to Washington to discuss the proposed design. He arrived the following day with engineers W. L. Gilmore and Henry Klecker. Mr. Curtiss and his engineers went over the preliminary studies prepared in the Bureau and proposed that the design have a short hull with a tail carried high above the water on outriggers as on a small Curtiss boat recently completed. Mr. Curtiss' idea was adopted in view of the greater seaworthiness, weight-saving and arcs of fire which such a construction permitted.

Admiral D. W. Taylor, U. S. N.
Photo Harris & Ewing

Plans were then prepared in the Bureau for a boat of this character to be fitted with three engines, one to be fitted with four engines, and for one to be fitted with five engines. The predicted performance was computed for each boat from which it appeared that the three engine boat could be made to satisfy the general requirements of the problem and could be much more quickly built and with smaller risk of failure. Admiral Taylor accordingly directed that the design staff of the Bureau be put on the plans of the three engine type. Investigations were at once undertaken to determine in a preliminary way, the construction of wing beams, struts, and the principal structural members, the proportions of wing area, fin and control surface areas, etc., and the materials to be employed for important parts. The general appearance of the design was worked out and the procedure established to be followed in making the detail drawings.

Test of the Model

A three foot model of the design was then made exactly to scale and tested by Dr. A. F. Zahm in the wind tunnel of the Washington Navy Yard. From his investigations of the forces on this model when held in a 70-mile an hour artificial wind, size and arrangement of tail surfaces needed to guarantee stability and correct balance in flight were determined. With a machine of the unprecedented size contemplated, it was virtually necessary that there should be no doubt on this score as an accident on the trial flights would set the project back many months besides risking the lives of six or eight men of the crew.

The design being worked upon was of dimensions so far beyond any previous experience in this country or of any of the designers in the United States that much unfamiliar territory would have to be covered. In order that the design might be successful, new methods of construction would be required, as, otherwise, the weight of the design would increase with such rapidity as to make success impracticable. In the state of design information and knowledge, as it existed in the United States on that date, this necessity was one of the greatest seriousness, and one which imposed upon the personnel connected with the design a great amount of investigation and experimentation in the working out of the details referred to.

Detail Design

It soon became apparent that the carrying on to the completion of designs work of such dimensions at the Bureau of Construction and Repair in Washington would be impracticable, unless the entire facilities of that Bureau were devoted to this work. Under the enormous pressure of air matters connected with the War which had devolved upon this Bureau, in common with the other Bureaus of the Navy Department, this was entirely impracticable, and it decided to arrange with the Curtiss Aeroplane and Motor Corporation of Buffalo, N. Y., to complete the drawings with their own design facilities and with the contribution by themselves of such ideas of value as might develop under the control and supervision of the Bureau.

A contract was, therefore, made with the Curtiss Company for the performance of this, the drafting and design work. Under the terms of this contract, they were to carry out all the work directed by the Navy Department, furnishing in connection therewith all facilities necessary. The Bureau of Construction and Repair reserved to itself the direction and oversight of all work coming under that Bureau, and, for this purpose, placed in charge, as its Field Representative, Naval Constructor G. C. Westervelt, U. S. N., whose headquarters were at the plant of the Curtiss Aeroplane and Motor Corporation, in Buffalo. Active work on the detail design was begun in Buffalo early in October. Shortly after the commencement Naval Constructor H. C. Richardson, U. S. N., was ordered for temporary duty in connection with the design of the hulls for the boats, and temporarily left his station at the Naval Air Station, Pensacola, Fla., to go to Buffalo.

The hull designed by this officer was of novel form and construction and embodied directly information obtained from his successful seaplane pontoons. The trial later showed that the form adopted represents very important improvements over the conventional flying boat hulls. The lines were based on model experiments. A series of models of hulls were made up and tested by Naval Constructors McEntee and Richardson in the towing basin at the Washington Navy Yard, and the planing properties of each investigated. The best of the series was adopted for the lines of the flying boat with confidence that there would be no disappointment in the breaking away from the water. To the working out of the structural details of the boat hull, W. L. Gilmore of the Curtiss Company contributed much valuable assistance.

Designated the NC-1

This large flying boat was very shortly designated as the NC-1. In this designation, the N is for the Navy, the C for Curtiss and the 1 is intended to indicate the first of a series of combined Navy-Curtiss designs. As the name would indicate, the design itself is a composite of ideas, these ideas being contributed by many persons, and being chosen and incorporated into the design on the basis of suitability and merit and without any reference to source.

In carrying on the actual work of design, the design as a whole was first devided into its main elements. These main elements were designed or approved by the Bureau of Construction and Repair. The details of these main elements were then distributed to the members of the design force at Buffalo working upon them. All ideas, whether of the Curtiss Company or of the Navy, were pooled, and as details were worked out, the decision as to the solution to accept was made as a result of discussion.

Weight and Dimensions

When this design had progressed sufficiently far to make possible an investigation of its resistance and speed, it was found that the power available in three Liberty Engines would be sufficient and the weight and dimensions were accordingly fixed as the following:

Flying weight 22,000 lbs.
Span 126 ft.
Chord 12 ft.
Gap 13 ft.
Length over all 68 ft. 3½ in.
Length over hull 45 ft.
Total wing area 2380 sq. ft.
Engines 3 Liberty 12.
Weight (empty) 13,000 lbs.
Speed 80 miles.

This design is the one which has been worked out and completed.

The detail design work on the NC-1 was commenced, as above stated, at Buffalo, N. Y., early in October. In the latter part of December, the major portion of the engineering and design staff of the Curtiss Aeroplane and Motor Corporation was taken over by the Curtiss Engineering Corporation at Garden City, N. Y., and were transferred there, taking with them the work in connection with the NC-1 design. At that plant the drawings were completed and arrangements for building made.

Authorization

By the early part of December, 1917, the design had progressed far enough, and gave sufficient promise of success to justify the Bureau of Construction and Repair, after obtaining concurrence of the Bureau of Steam Engineering as to the power plant, in requesting authority to have four of the type built. This authority was received from the Secretary of the Navy, and instructions were issued for the preparations of a requisition for the covering of the expenditures involved. It was to be feared that the throwing of this work of construction upon the aeroplane manufacturers already overburdened with other demands would result in delaying airplane work already in progress for the Navy Department. This apprehension was expressed in the following letter, in which authority was extended for the construction of these large flying boats:

Navy Department, Washington, D. C.
December, 21, 1917.

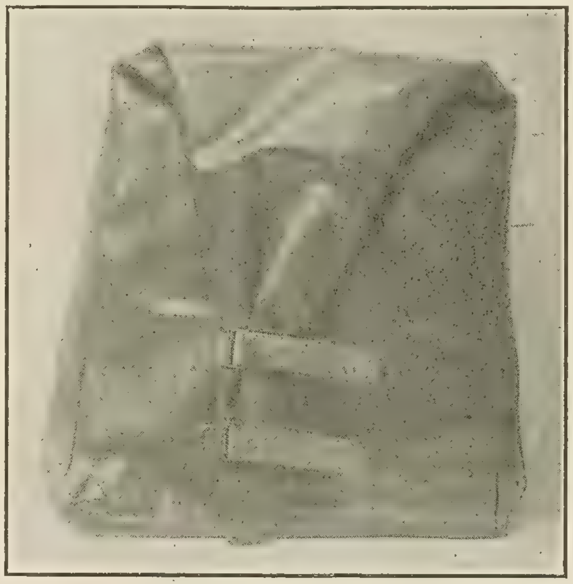
To: Bureau of Construction and Repair and Bureau of Steam Engineering.

Subject: Three Engine Flying Boat Proposed.

1. The Bureaus are directed to prepare a requisition as recommended in their joint letter of 7 December, 1917.

2. The construction of these seaplanes shall in no way interfere with the production of aircraft to meet the program already laid down, nor with the development and construction of special types of aircraft as recommended by Commander Naval Aviation Forces Abroad.

(Signed) JOSEPHUS DANIELS.



Mail bag used by seaplanes in carrying mail from air stations to ships of the Navy

Construction

A contract was made with the Curtiss Engineering Corporation for the building of four flying boats of the NC type. Due to the large size of these boats and to the many novel features of construction involved, it was impossible to estimate with any degree of accuracy the probable cost and, accordingly, the contract awarded the Curtiss Company was on the basis of cost of work plus a percentage for profit. This required the placing of this work under the close supervision of the Department, and this supervision through the building of these flying boats, was exercised for the Bureau of Construction and Repair by Naval Constructor G. C. Westervelt.

The plant of the Curtiss Engineering Corporation at Garden City, N. Y., was of insufficient size for building of flying boats of the dimensions of the NC-1. It was, accordingly, necessary for the Navy Department to authorize the building, at its own expense, of a building attached to this plant of sufficient size for the complete assembly of two of these flying boats at one time. In addition, the ordinary facilities of the Curtiss Company were such that it was certain that the attempt of that organization to carry out in complete detail the entire construction of these flying boats would be productive of most serious delays in completion. It was decided to build them on the assembly basis. That is to say, the various elements would be built by various manufacturers building a product of a somewhat similar nature, or one requiring workmen of similar quilifications to those ordinarily employed for work of the nature of that in contemplation. These different elements would then be shipped to Garden City to be there assembled into the flying boats. As a result of this decision, different parts were built at the following places:

Builders of the Parts

Boat Hulls: Curtiss Engineering Corporation, Garden City, N. Y.
Lawley & Sons Boat Co., Boston, Mass.
Herreshoff Co., Bristol, R. I.
Tail Booms: Pigeon—Fraser Hollow Spar Co., Boston, Mass.
Gasoline Tanks: Aluminum Co., of America, Pittsburg, Pa.
Wings, Control Surfaces and Struts: Locke Body Co., New York.
Nacelles, major details gasoline system and all wiring: Curtiss Co., Garden City, N. Y.
Metal Fittings: Unger Bros., Newark, N. J.
Beaver Machine Co., Newark, N. J.
Brewster Body Co., New York, N. Y.
Wing Tip Floats, Albany Boat Co., Albany, N. Y.
Liberty Engines: Packard Motor Car Co., Detroit, Mich.
Ford Motor Car Co., Detroit, Mich.

There was also not available at any Operating Station hangars of sufficient size for housing these flying boats. Construction was arranged for by the Navy Department at the Rockaway Beach Naval Air Station of a building of sufficient size for housing two of these boats. Due to their very large size special handling arrangements of the Marine Railway type for getting them into and out of the water when necessary were provided. The Rockaway Beach Naval Air Station was chosen for the location of the hangar and handling arrangements on account of its nearness to the Curtiss Engineering Corporation plant and of its excellent location for carrying out the flying tests, which would be necessary.

Completed in One Year

The first of these flying boats was completed and flown October 4, 1918, or approximately one year from the commencement of the design. The trials were a source of great satisfaction as it was soon demonstrated that the control and balance in the air were very satisfactory, and in accordance with the prediction of the wind tunnel tests, and that the performance on the water was all that could be desired and entirely justified the confidence placed in the model tests in the towing basin. No structural weakness developed and the speed came out as predicted. In short, this flying boat designed from theoretical and model experimental, data, combined with the practical experience of a half dozen or more people, performed in every way so close to her designed characteristics as completely to justify the methods of the Naval Architects here applied in the design of a flying machine.

Tests and Changes

As flying tests on the first boat were continued many changes were tried to improve the original design, and, as these were found advantageous, were incorporated on this and on the other three boats building.

The Bureau of Steam Engineering, at this stage, was able materially to improve the performance of the boat by the application of new propellers designed in that Bureau. The NC-1 was originally fitted with standard Navy low compression Liberty engines, which were found to be entirely satisfactory, but during the period that the NC-1 was being tested with these engines the Bureau of Steam Engineering, at its experimental laboratory at the Washington Navy Yard perfected carburator adjustment on the high compression Liberty Engines which materially improved its economy. Since the high compression engine gave greater power that the low compression engine, such engines replaced the original installation on the NC-1. With the new propellers and the new engines, the boat got out of the water and flew easily with a total weight of 24,700 lbs. The designed boat was 22,000 lbs. Besides providing propellers and engines for the boat, the Bureau of Steam Engineering supplied a remarkably efficient electric self-starter to each engine. This type of self-starter weighed only 35 lbs., and by means of this improvement it was possible for the pilot to start any engine without leaving his seat. It is believed that this constitutes the first application of an electric self-starter to the Liberty engine.

The month of November, 1918, was spent in thoroughly trying out the NC-1. Among other flights a round trip from Rockaway, N. Y., to Washington, D. C., via the entrance to Chesapeake Bay was made with nine people on board. On November 25 the NC-1 broke the world's record for passenger carrying, having on board in the air 51 persons. One of these was a stowaway, who had concealed himself in the interior of the hull

(*Continued on page* 22)

Hawker and Grieve Believed to be Lost

Started from St. John's in a Sopwith on May 18 and Have Not Since Been Heard From

Harry G. Hawker and his navigator, Lieut. Commander Mackenzie Grieve, started from St. John's, N. F., in their Sopwith biplane on the attempt to cross the Atlantic to Ireland Sunday, May 18, at 5:51, Greenwich mean time, (1:51 New York time).

About an hour later Captain Frederick P. Raynham and his navigator, Captain C. W. F. Morgan, attempted to make a start in the Martinsyde biplane, but an axel broke and their machine was wrecked, both aviators being injured, though not seriously.

The Sopwith machine ascended from the Mount Pearl Aerodrome in the presence of about 100 spectators who had motored there to witness the "take-off," and winged her course toward Ireland.

Several of the onlookers with aviation experience assert she almost crumpled her under carriage before ascending. The assembled spectators raised a hearty cheer as the machine mounted higher and the airmen waived a farewell. The machine circled skyward until it reached about 2000 feet, then flew east over the city which lies five miles from the aerodrome, and headed over the white hills to the open sea.

Hawker Drops His Carriage

The Sopwith left the ground in a graceful curve, gradually ascended until it was about 2000 feet above the aerodrome, while the cheers of the crowd became inaudible from the droning of the motor, and then headed eastward over the city where practically every inhabitant rushed to the streets.

The day was an ideal one for such a sight, the sky being cloudless and the breeze only moderate, and the airplane made an exceedingly attractive picture as it crossed the city from west to east. In running over the city the Sopwith passed across Quidi Vidi Lake, alongside which the Martinsyde has its aerodrome, and here thousands of citizens were assembled. They had been attracted to the Martinsyde ground because it is near the city, and numbers journeyed there on foot to await the start of the Martinsyde machine. They greatly enjoyed the picture presented by the rival airplane.

Crossing the white hills, which are a line of cliffs forming the seacoast in this vicinity, Hawker pulled the trap which released his wheels, and these dropped to the ground, where two of his mechanics were waiting to locate them.

From the outset the Sopwith aviators planned to drop these wheels and their carriage, thereby lightening the weight of the biplane by about 400 pounds, and increasing its speed, it is estimated, by about eight miles an hour.

Last View of the Australian

From the hills the plane sped seaward and was shut off from view. The lookout on Signal Hill, which is an eminence overlooking the harbor where a ship reporting station is located, viewed the plane for about ten minutes longer and says it then passed from his sight, headed directly for the Irish Coast, and traveling at about 100 miles an hour, with a strong following breeze.

Hawker's departure was entirely unexepected, save by the men of his crew and a few of his intimate friends. It was known that since the first of April, when he arrived here, first of the entered transatlantic fliers to reach Newfoundland, he has been under an increasingly great strain as the days passed by. The plague of contrary winds, storms at sea, the depressing fogs and searching chill of Newfoundland descended upon him in measure unseasonable even in forbidding Newfoundland.

Then came Raynham, a week behind him. He congratulated his younger rival and wished him luck with the real feeling of a sportsman. Then came the other contenders, Col. John Cyril Porte's great Handley Page seaplane, with two engines, able to ride rough seas indefinitely; Capt. John Alcock, who proposed to fly a great Vimy-Vickers bombing machine across the Atlantic, and Capt. P. S. Bennett, who planned to span the ocean with a Bolton & Paul three seated machine.

All the other contestants but Raynham had bigger machines and better chances than Hawker. He welcomed them all and hoped the best man would win. Then came the American Navy men with three great seaplanes. Hawker honestly doubted their ability, with their great weight—a weight which he considered their four heavy engines increased unnecessarily. On the day they left Trepassey Bay Hawker still was waiting anxiously upon the weather reports which came to him from Great Britain, from ships at sea and from the local authorities.

Some of the townspeople, weary of the delay, began to wonder, some more openly than was polite, when he was to get away. But it was when the Americans reached the Azores that Hawker determined to leave despite the absence of those perfect conditions for which he hoped—conditions which probably would mean the difference between life and death to him.

Photo by International Film

Harry G. Hawker and Commander Mackenzie Grieve

Wished to Beat Americans

He determined to take a chance—or rather to add another chance to the multitude which he was taking—and leave without positive assurances that head winds in mid-ocean would not meet and beat back his plane until gasoline exhausted it sank.

His decision, made after an early morning visit with his navigator to the office of the Royal Air Force meteorologist, was with the intention of beating to England the American seaplanes, one of which he learned was at the Azores within 950 miles of continental Europe. Hawker is a professional flier, and he would lose none of the London *Daily Mail* prize of $50,000 should the Naval flying boats beat him to the British Isles, but his patriotism urged him on in fair competition.

Immediately after the decision Hawker's spirits soared upward. Despite the report of the weather men, which he quoted as "not yet favorable, but possible," the strain upon him seemed to have relaxed.

With Grieve—who was as unconcerned as the pilot, as became a British naval officer in the face of great peril, probably greater than he had faced during his active service in submarine infested waters during the war—with his navigator, Hawker jested lightheartedly as they packed their satchels.

Gravely weighing Commander Grieve's satchel Hawker inquired of his companion in the perilous adventure:

"Can't you dispense with pajamas just for the trip?"

And in response to a question about sleep during the voyage, for Grieve has had some slight experience as a pilot and may fly the machine for short intervals, Hawker replied:

"We'll have a long sleep coming at the end of the trip—anyway."

All Ireland Was the Mark

"If we strike Ireland anywhere we will have found our mark," Commander Grieve said before the start, in speaking of the difficulties ahead of him. "If we hit England instead, we merely will be nearer home. Although Atlantic air currents never can be marked like ocean currents, I hope to compile observations on the way that will make the trans-Atlantic passage possible with fewer uncertainties for later flyers than those which confront the pioneers. In the day time I will of course use the sun for observations, and at night the North star.

"Should clouds obscure the stars we will try to use them to calculate our speed and direction, although of course such reckoning would be only approximate."

The fliers carried 340 gallons of gasoline which made their plain weigh 6000 pounds at the start. If Brooklands were reached Hawker would be much more likely to land his wheelless machine without turning it over and wrecking it utterly. It was at this ideal field that he demonstrated to doubting air experts the possibility of dropping the under structure of a plane. In landing on the smooth surface, Hawker smashed his propeller and the lower wing of his machine, but was almost unhurt himself. The plane was lightly loaded.

Hawker calculated he would reach the Brookland airdrome about twenty hours after the start, that is, Monday afternoon, Greenwich time, or about 10 in the morning Newfoundland time.

Used a Scout Type Machine

The plane to which they entrusted their lives has less than half the wing spread of the NC seaplanes which they hoped to beat to Europe. It was a scout type, with a span of 46½ feet. From propeller to rudder it was thirty-one feet. The motor, a Rolls-Royce twelve cylinder, was in the head of the machine, fed by the gasoline tank just behind. Then back of the tank was the little cockpit, in which the pilot and the navigator sat. Behind them was the boat, fitting into the fuselage. The 375 hp. motor and plane were both carefully tested by Hawker at the Sopwith plant in England. He flew for nine hours and five minutes, covering approximately 900 miles and using 146 gallons of gasoline. In tests it has displayed equal reliability, although no long flights were undertaken in New Foundland.

Raynham's Failure

Unlike the almost secret departure of Harry Hawker, the effort of Capt. Frederick Raynham and Capt. Morgan to take the air was witnessed by almost the entire city of St. John's. Both fliers were without trace of nervousness and both exchanged pleasantries with their friends before they climbed into their machine. It was just at the moment when the cheer rose highest, as the plane rose perhaps eight feet into the air, that the crash occurred. The nose of the plane ploughed through

(*Continued on page* 19)

The Men Who Showed Their Skill and Courage

Commanders and Crew of the Three NC Boats in the Navy's Trans-Atlantic Flight

The men who undertook the epochmaking flight the Atlantic in the naval seaplanes were chosen from the best pilots in the Naval service. Two of the commanders are pioneers in the art of flying and have seen remarkable careers in the Navy. All, with one exception, failed to see active service during the war. This was chiefly due to their excellence as pilots, which caused their commanders to utilize their services as instructors.

The service records of the men are as follows:

Crew of the NC-1

Lieutenant-Commander Patrick Nelson Lynch Bellinger, commanding officer of crew No. 3, is the only officer in the navy who has commanded craft beneath the surface of the seas, on the seas and above the seas. He was also one of the first naval aviators. He was the first American aviator to fly over hostile lines.

He was born at Cheraw, S. C., Oct. 8, 1885, and entered the Naval Academy as midshipman June 22, 1903. After service on several warships he was sent to the Atlantic submarine flotilla for instruction April 13, 1912, and later placed in command of the submarine C-4. In November of the same year he was detailed for instruction in aviation, and in January, 1913, went to help establish the aviation camp at Guantanamo, Cuba.

He was the first of the naval aviators to reach Vera Cruz in April, 1914, and immediately flew over the Mexican lines. During the present war he served as a seaplane pilot aboard the North Carolina. From November last year until appointed to the transatlantic flight Commander Bellinger commanded the naval air station at Hampton Roads.

Immediately the plans for the transatlantic flight were decided upon Commander Bellinger was sent in a destroyer to select a suitable site for a jumping-off place in Newfoundland. He it was who decided upon Trepassey Bay.

Lieutenant Commander Marc Andrew Mitscher was born at Hillsboro, Wis., Jan. 26, 1887. He entered the Naval Academy as a midshipman July 9, 1904. He served on several warships until June 8, 1916, when he learned to fly at Pensacola, Fla. He has been in command of several naval air stations.

Copyright by Paul Thompson

Lieut.-Commander A. C. Read of the NC-4

Lieutenant L. T. Barin was born at Portland, Ore., Aug. 20, 1890, and received his commission in the naval volunteers June 8, 1917. He has served at various naval air stations. Lieutenant Barin is making the flight despite a sprained right wrist which he sustained while handling his ship in Halifax.

Photo by Keystone Photo News

Commander John H. Towers of the NC-3

Lieutenant Harry Sadenwater, radio operator of Crew 3, was born in Brooklyn, Sept. 3, 1894. He obtained a provisional commission as Ensign, April 24, 1917, winning his pilot's wings in May the following year.

Chief Machinist's Mate Irvin Kesler has served several enlistments in the navy, which he first joined Jan. 5, 1905, at Dayton, Ohio. He was born at Eton, Ohio, March 3, 1882. Kesler has flown in seaplanes and dirigibles. He also took a course as aviation engineer at the Navy Gas Engine School, Columbia University.

Machinist Rasmus Christensen, reserve pilot engineer of Crew 3, was born in Norway at Tornbull, March 28, 1883. He was appointed a temporary machinist while serving as an enlisted man at the Anacostia, D. C., naval air station.

Crew of the NC-3

Commander John H. Towers, officer in charge of the flight and commander of crew No. 1, was born at Rome, Ga., Jan. 3, 1885. He was the first naval officer to learn flying and the first to take command of a naval aviation camp.

He was graduated from the Naval Academy, Annapolis, Feb. 12, 1906, as a midshipman. After service on six ships of the line he was promoted to ensign. Further service afloat brought him to the rank of lieutenant, junior grade, on June 30, 1911, when he was detached and sent to Hammondsport for instruction in aviation. There he learned to fly under Glenn H. Curtiss.

In the fall of 1912 Towers established the American endurance record of six hours. The same year he was placed in command of the newly established naval air station at Pensacola, Fla.

When the Mexican crisis developed in April, 1914, Commander Towers was sent down in command of the navy's air forces of two flying boats and two seaplanes. With him were Lieutenant Commander Bellinger, who commands crew No. 1 in the present venture, and Lieutenant Saufley, who was later killed in a flying accident.

Following the settlement of the Mexican problem, Towers was sent to Hammondsport to take part in the Rodman Wanamaker preparations for flying across the Atlantic in the flying boat America.

This project had rapidly developed when the European war put an end to the attempt. Commander Towers was sent to London as assistant to the naval attaché there, where he remained until July 31, 1916.

When the United States entered the war Commander Towers was appointed a member of the Army and Navy Board on selection of sites for air stations in the third, fourth and fifth naval districts.

On Feb. 6 he was appointed commander of the transatlantic flight, and placed in charge of development of plans and assembly of materials and personnel for the project. "April 21, 1919," according to official orders, he was "ordered to proceed to such place as the NC Seaplane Division 1, that will make the transatlantic flight, may be, reporting to the commandant of that naval district, and assume command of that division when placed in commission. As commander of the NC Seaplane Division 1 his status will be the same as a commander of a division of seagoing ships of the navy."

Commander Holden Chester Richardson, one of the three designers of the NC type of seaplane, was born in Pennsylvania, Dec. 7, 1878. He entered the Naval Academy Sept. 8, 1897, and was appointed ensign June 7, 1903, after service on the Illinois and the Massachusetts. After a special course in the Massachusetts Institute of Technology he was appointed an assistant naval constructor.

(Continued on page 13)

Lieut.-Commander P. N. L. Bellinger of the NC-1

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Formerly Air Service Journal

A Display of Ill Temper

OUR excellent contemporary *The Aeroplane,* which prints the caustic criticisms of C. G. Grey, has published under the title "Trans-Atlantic Sabotage" as unpleasant a suggestion as has crossed the ocean in years. It openly warns English contenders for trans-Atlantic laurels to avoid American mainland or "see that their material is closely guarded by absolutely trustworthy people, and that they themselves take every precaution against being doped or otherwise rendered unfit for service." The reason given for this slander is that there is unusually heavy betting in America and that commercial interests behind the Liberty engine will stop at nothing to prevent any other engine being used.

It is quite evident from the insinuations made by *The Aeroplane* that it not only does not know much about conditions in the United States nor American sporting characteristics. It is a palpable alibi to afford some excuse for the failure of the English contestants for the trans-Atlantic flight to make good on their much advertised "hop."

The Navy, far from being contaminated by Liberty engine propaganda, undertook the venture as a war measure, to assist in the delivery of seaplanes to help put down the submarine menace to England.

That the trip should have been undertaken at a time when English commercial concerns were striving for a $50,000 prize, with the resulting advertising prestige, is perhaps the cause for the show of ill temper on Mr. Grey's part.

So far as the "sabotage" warning is concerned, it indicates that I. W. W. propaganda has found fertile soil in piqued minds. The fact that at the moment the United States constructors and pilots hold world records for speed, distance, and altitude, and that returning pilots pronounce the new types of American airplanes better than they have seen or flown overseas has caused this flow of venom. It is hoped that the usual good taste shown in the columns of *The Aeroplane* will prevent a repetition of such unsportsmanlike comment.

The Ship Airplane

THE Navy has recently issued specifications for a ship airplane which offers an interesting problem in design. The ship airplane is a seagoing scout which is to be launched from the bow of a ship steaming into the wind. It is assumed that the seaplane will run off under its own power, using skids or a wheeled carriage with a run of about 75 feet against a relative wind of 25 knots made up of a 10 knot head wind and 15 knot speed of vessel.

The Navy has not yet definitely decided as to the type of skid or carriage, but is understood to be working on the problem.

The utility of such a vessel is at once apparent, since it is not always possible to start a seaplane off by launching it over the side and letting it get away from the water, in rough ocean weather. But the design of the vessel is by no means easy.

To make a quick get away, the seaplane must fly at a low speed, that is its loading per square foot must be low. To make a quick get away and climb well it must also have a low weight per horse-power. These two conditions are not at once reconcilable, since a low weight per horse-power means a heavier wing structure. Also while low weight per horse-power is absolutely essential the seaplane is expected by the Navy to land in all manner of weather and therefore be a robust sea-going craft, with sufficient excess buoyancy.

When a designer starts computations he will find a hard problem facing him, which to be solved requires the abandonment of standard methods and the introduction of improvements in his structure.

It is expected on these grounds that the ship airplanes now being designed will embody many new features and their appearance and trials will bear watching.

International Air Rules

THE international rules for aircraft which are being prepared for promulgation in Paris by various committees will have less effect on the United States than any other country. Our area is so vast and the incentive to fly over Canada or Mexico is so slight that any rules which are made will have slight influence on our aeronautical development.

The rules of the air, which will undoubtedly become universal, will be more important and will be scrutinized with extreme care by American representatives. It is fortunate that there are, or will be available at these final meetings men who understand the requirements of the United States in this respect.

Fine Trip of the C-5

THE 1,000-mile cruise of the United States naval airship from Montauk Point naval air station to St. Johns, N. F., was a magnificent demonstration of the long distance possibilities of lighter-than-air craft of comparatively small size and of the excellence of American airship construction. If one considers that the C-5 is a comparatively small vessel, displacing some 12 tons as against 65 tons for the British rigid, which is reported to be fitting out for the trans-Atlantic flight, this performance will be appreciated at its true value.

Despite exceedingly unfavorable atmospheric conditions prevailing toward the end of her trip, the C-5 successfully outrode the hostile elements and landed in Newfoundland according to plan, having covered the distance of 1000 nautical miles in 25 hours, 40 minutes.

Her landing alone, accomplished in foggy weather, furnished an instructive example of one of the great advantages embodied in lighter-than-air craft, namely, the ability to hover and choose a landing at leisure.

The fact that the C-5 was afterwards carried seaward by a 40-mile gale, having torn herself from the hands of the handling party, detracts nothing from the value of this remarkable long distance flight, but simply shows the necessity for providing a more efficient mooring system—a detail which practical experience alone can solve.

Technical Section Location

THAT the whole problem of a permanent location for the Technical Section now located at McCook Field is to be given wider discussion is evident from the rumored decision of Secretary Baker to submit the matter to Congress. Plans of far reaching importance have been made in great haste in the past due to war conditions. Such urgency is now a thing of the past.

Before a clear opinion can be formed on the future of the Technical Section, the broad question of the peace time Air Service must be answered. Then, and not till then, can a decision be reached which will satisfy all who may have an interest in the experimental and engineering work of the Air Service.

The Men Who Showed Skill and Courage

(*Continued from page* 11)

On February 8, 1908, he was sent to Washington, where he commenced the experiments on hydroaeroplanes that laid the groundwork for his later successes in designing boat bodies and floats for seaplanes.

On Nov. 27, 1918, Commander Richardson, piloting the NC-1, established a world's record at Rockaway by flying with fifty passengers, excluding himself. He has designed practically all the hulls at present in use by the navy on aircraft.

Lieutenant David H. McCullough, pilot before the war, entered the Naval Air Service when the United States entered the war and was given the rank of provisional lieutenant, United States Naval Reserve Force, Oct. 25, 1917. He was born at Port Royal, Pa., April 23, 1890. After service at various naval air stations along the coast, he resigned from the service Dec. 17, 1918. On March 5 he was recalled to service especially to act as pilot on one of the NC flying boats in the flight across the Atlantic.

Lieutenant Commander Robert Alfred Lavender, wireless expert of the expedition, was born at Rockwell City, Iowa, Sept. 17, 1889, and appointed midshipman in the Naval Academy May 11, 1908. In June, 1917, he conducted a series of tests and experiments with wireless telegraph sets on dirigibles, and later aided in development of aeroplane wireless telegraph and telephone sets.

Machinist Lloyd Ray Moore, engineer of Crew No. 1, was born in Grand Island, Neb., June 3, 1892. While serving as an enlisted man in the naval air station at Pensacola, Fla., was appointed a temporary boatswain May 20, 1918. He was detached specially for the transatlantic.

Lieutenant Braxton Rhodes was born at Windsor, N. C., Oct. 7, 1892, and is the only aviator attached to the crews who saw service in France. He was given a provisional commission as ensign Nov. 24, 1917, and went to the United States naval air station at Killingholme, Ireland, in April the following year. In July he was transferred to the station at St. Trojan, France, on active service.

Crew of the NC-4

Lieutenant Commander Albert Cushing Read, commander of Crew No. 2, was born at Lyme, N. H., Mar. 29, 1887, and first entered the naval service as midshipman July 8, 1913. He served for several years with the Pacific fleet in the Far East.

On June 30, 1915, he was detached for instruction in aeronautics. During the war he had commanded several naval air stations along the coast, including all on Lond Island. He was also a member of the test board for heavier-than-air craft.

Lieutenant Elmer Fowler Stone was born at Livonia, N. Y., Jan. 22, 1887, and joined the Coast Guard Service as a cadet April 30, 1910. He was commissioned as a third lieutenant in the revenue cutter service and assigned to the Onondaga June 6, 1913. He learned to fly at Pensacola, and during the war saw service as a seaplane pilot aboard the U. S. S. Huntingdon.

Lieutenant Walter Hinton was born in Van Wert, Ohio, Nov. 10, 1888. After serving as an enlisted man he was appointed a temporary boatswain Nov. 15, 1917, at Pensacola. He was promoted to ensign in March the following year. He served at various naval air stations, and on Jan. 15 last flew the H-16 type of flying boat No. 839 from Rockaway to Hampton Roads, Norfolk, Va.

Ensign Charles Rodd, radio officer of Crew No. 2, was born at Cleveland Sept. 4, 1894. He was given a provisional commission as ensign in the Naval Reserve Force Aug. 20, 1918.

Lieutenant James L. Breese, Jr., reserve pilot of Crew No. 2, was born at Newport, R. I., July 12, 1885. He was given provisional rank of ensign Nov. 12, 1917, and has served at various naval air stations.

Current Appropriations

Amounts appropriated comprise appropriations for the fiscal year ending June 30, 1919, plus the balances on July 1, 1918, of such appropriations as did not lapse on that date. Amounts repealed by the Second Deficiency Act have been deducted, with the exception of the item of $829,000,000 expected to be re-appropriated for the Quartermaster Corps.

Against the balance of $4,400,000,000 there are outstanding nominal obligations of about $4,500,000,000. This figure, however, represents in large part the value of contracts already suspended and awaiting liquidation. Savings effected in settling such contracts will reduce the amount of actual obligations well below the present balance.

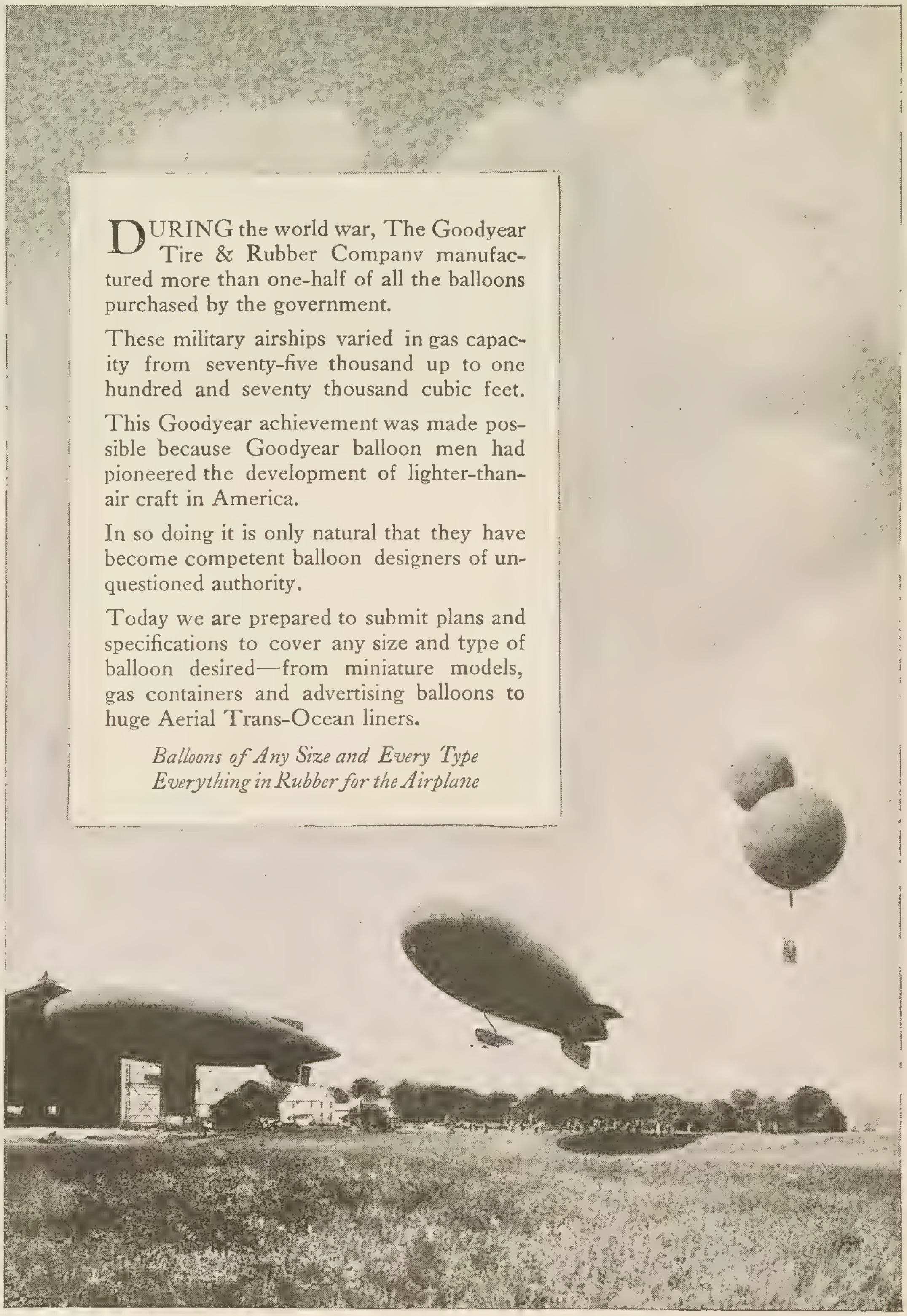
	Appropriated	Withdrawn from Treasury	Balance in Treasury
Aircraft production..	$360,527	$135,304	$225,223
Military aeronautics.	107,454	23,328	84,126

PER CENT OF APPROPRIATIONS WITHDRAWN

	To April 15	To March 31
Aircraft production	38	37
Military aeronautics	22	21

Aircraft Engineering Corp. Address

In the Aircraft Engineering Corp. advertisement in the last issue of AIRCRAFT JOURNAL the general offices of the company were incorrectly printed as 220 West 42 Street, New York. This address is the sales office and for correspondence relating to sales. The general offices are at 2 East End Avenue.



DURING the world war, The Goodyear Tire & Rubber Company manufactured more than one-half of all the balloons purchased by the government.

These military airships varied in gas capacity from seventy-five thousand up to one hundred and seventy thousand cubic feet.

This Goodyear achievement was made possible because Goodyear balloon men had pioneered the development of lighter-than-air craft in America.

In so doing it is only natural that they have become competent balloon designers of unquestioned authority.

Today we are prepared to submit plans and specifications to cover any size and type of balloon desired—from miniature models, gas containers and advertising balloons to huge Aerial Trans-Ocean liners.

Balloons of Any Size and Every Type
Everything in Rubber for the Airplane

GOODYEAR
AKRON

NC-4's Great Flight to the Azores

(*Continued from page* 4)

at 17.50 G. M. T. (1.50 P. M. Washington time) May 19, having lost starboard pontoon just outside harbor."

NC-3 and NC-1 Out

Admiral Jackson reported that the NC-3 found it impossible to attempt the fourth leg of the flight, the jump to Lisbon. Struts of the forward engine are badly damaged and the hull is leaking.

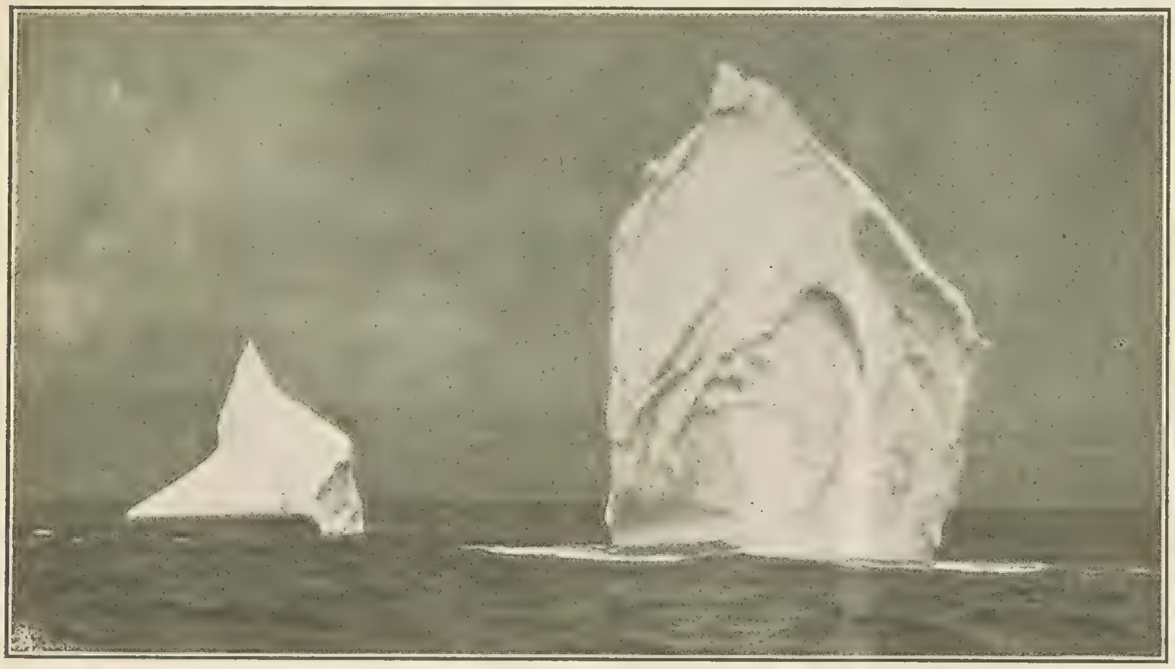


Photo by International Film Service

Iceberg 200 Feet High at the Entrance to Trepassey Bay

Commander Bellinger's Report

Lieut. Commander P. N. L. Bellinger, commander of the NC-1, gave out the following statement May 19:

"The NC-1 was the last plane to take the air at Trepassey, doing so at 10.10 P. M. Friday (Greenwich time). We proceeded on the course, being guided by the smoke and searchlights from the destroyers and the star shells they sent up. After passing most of the station ships we did not meet with any trouble until we got into fog, at 11.10 A. M. Saturday, when we were near Station 18. After being in the fog for some time we alighted on the water at 1.10 P. M. Saturday.

"We kept to our course until we struck the fog, when we lost our bearings. We deemed it advisable to head into the wind toward land to get our bearings before proceeding. We were then flying about 5,000 feet up. We dropped to 50 feet, in order to sight water, and found that the wind was in a different direction on the surface of the water than it was above, and also that the fog was more dense at the lower altitude.

"We made a good landing on the sea, which was rough and choppy, with heavy swells. The strong wind continued until we were picked up.

"At 6 P. M. (Greenwich time) we sighted the masts of the Ionia on its way to Fayal and Gibraltar, above the horizon. We were unable to see the hull of the Ionia, and as she did not have wireless we were unable to communicate with her. We, therefore, started taxing toward her. About this time the Ionia sighted us and lowered a boat, which picked us up at 6.20 P. M.

"Our position, when we were picked up, was latitude 39 degrees 58 minutes north, longitude 30 degrees 15 minutes west. We tried to salvage the plane, but the towlines of the Ionia broke and we were forced to give up the attempt.

"We were rescued with difficulty, because the small boat of the Ionia was tossed about like a cork. All of us were seasick. Otherwise we did not suffer.

"We sent out S O S calls after landing, but the radio sending radius was only fifty miles on the surface of the water. While awaiting rescue we intercepted messages between destroyers. We last heard the radio of the NC-3 at 9.15 o'clock Saturday morning.

"If the fog had not been so thick we could have continued to Ponta Delgada. Our engines worked splendidly throughout. The average altitude of the flight was between 500 and 3,500 feet."

The steamer Ionia is probably the Greek ship of that name. It left New York on May 4 for Norfolk. Arriving at Norfolk on May 6, the Ionia departed the same day for Gibraltar and would have been in the path of the transatlantic flight.

Quick Run to Porta Delgada

The NC-4, flying from Horta, Fayal, to Ponta Delgada, St. Michael's, at the Azores, at an average speed of 99.7 land miles an hour, made the fastest time on May 20 yet made by any of the seaplanes on the ocean flight. She took off at 8.40 o'clock, New York time, and landed in the harbor at Ponta Delgada at 10.24 o'clock, one hour and 44 minutes later. The distance is 150 nautical miles, and her speed in knots averaged 86.7 an hour, about eight knots faster than the trip from Trepassey to Horta.

Commander Towers's Statement

"Exceptionally bad weather, which was totally unexpected, was the sole reason for the failure of all three of the American Navy's seaplanes to fly from Trepassey, N. F., to Ponta Delgada on schedule time," said Commander John H. Towers at Ponta Delgada May 20.

The man who commanded the overseas flight in his flagship NC-3 and the members of his crew, who had received a severe buffeting both from the storm overhead and the turbulent sea when the plane was damaged Saturday in alighting on the water, were much refreshed Tuesday after having regained sleep lost while bucking the storm for sixteen hours and being adrift fifty-three hours more, entirely out of communication with the world.

"Individually," said Commander Towers, "the members of the crew of the NC-3 virtually gave up hope of being rescued Saturday night, but collectively they showed no signs of fear and 'carried on' until they arrived in port here Monday and heard the forts firing salvos in welcome and witnessed the scenes of general jubilation over their escape from the sea.

Came Down Saturday

"Having run short of fuel and encountered a heavy fog, the NC-3 came down at 1 o'clock Saturday afternoon in order that we might obtain our bearings. The plane was damaged as it reached the water and was unable again to rise. While we were drifting the 205 miles in the heavy storm the high seas washed over or pounded the plane, and the boat began to leak. So fast did the water enter the boat that the members of the crew took turns in bailing the hull with a small hand pump, while others stood on the wings in order to keep the plane in balance. Meanwhile we were steering landward.

"That our radio was out of commission was not known to the crew until our arrival here. Communication had been cut off since 9 o'clock Monday morning owing to our having lost our ground wire.

"We ate chocolate and drank water from our radiator. This was our only means of subsistence. The crew smoked heavily in order to keep awake while we were drifting. No one of us obtained more than four hours of sleep after leaving Trepassey until Ponta Delgada was reached."

The hands of all the members of the crew of the NC-3 were badly swollen as a result of their heroic work at the pump. Otherwise they did not undergo any suffering, except Lieutenant Commander McCulloch, one of the pilots, who had a rather severe attack of seasickness. The men have now fully recovered from their trying experience.

Lost Companion Planes Under Clouds

"The NC-3 encountered heavy clouds at 1 o'clock Saturday morning. The light instruments on board failed, and we sailed the plane above the clouds in order to get the benefit of a moonlight reading of the instruments.

"We kept in sight of the NC-4 until nearly daylight Saturday, and with the NC-1 until shortly after daylight. All the planes were flying in formation, but the NC-1 and NC-4 were underneath the clouds part of the time because their light instruments were good.

"The NC-3 had no difficulty in being guided by star shells, searchlights, and smoke from the station ships until we reached Station 14, which was not seen.

"I assumed that we were off our course, but did not know on which side, and began flying a parallel course in what I thought was the direction of Corvo. Shortly after daylight we encountered a heavy fog, rain squalls, and high winds, all of which continued until the NC-3 went down upon the water.

"Before alighting on the surface of the sea my calculations showed us to be in the vicinity of land, but with only two hours' fuel supply on hand, and with the weather clearing, it was decided to land and ascertain our exact position.

"Our radio kept up sending messages, assuming that the torpedo boat destroyers were picking them up. We did not know the radio was useless and that the destroyers had not been receiving the messages.

"All the crew thought the sea would moderate, but the plane was so badly damaged in the high billows that we were unable to rise again.

"We were sixty miles southwest of Pico when we alighted, the position being where we had figured we were before coming down.

Storm Battered the Drifting Plane

"The clearing of the weather proved only temporary, for later a storm came up and continued for forty-eight hours. With both lower wings wrecked, the pontoons lost, the hull leaking, and the tail of the machine damaged, the plane was tossed about like a cork.

"In order to conserve the remaining 170 gallons of fuel we decided to 'sail' landward, hoping to sight a destroyer on the way. But we did not pass a single ship until we reached Ponta Delgada.

"Off the port we declined proffered aid by the destroyer Harding, which had been sent out to meet us, and 'taxied' into port under our own power.

"During the two days' vigil of seeking land or rescue ships we fired all our distress signals, none of which apparently were seen.

"Without informing the crew of the fear that I had that we would be lost, I packed our log in a waterproof cover, tied it to a lifebelt, and was prepared to cast it adrift when the NC-3 sank.

"The nervous strain was terrible while we were drifting, and the men smoked incessantly. This was the only thing that kept them awake.

"I believe a transatlantic flight is practicable without a stop with planes a little larger than the NC type. The engines of all three of the planes worked perfectly and could have run 6,000 miles more if there had been sufficient fuel on board.

"Wire trouble in the instrument board was the mechanical defect experienced by the NC-3."

Emphasis is placed on the fact that the transatlantic flight will actually end at Lisbon. The additional 775 nautical miles between Lisbon and Plymouth, England, were thrown in as an "extra" and as a compliment to our friends, the British.

The Bureau of Construction and Repair of the Navy Department is now working on the designs for seaplanes considerably larger than the NC type. This fact has been disclosed by Secretary of the Navy Daniels.

Airship and Airplane

Glen H. Curtiss, co-designer with the Navy Department of the NC seaplanes now flying across the Atlantic Ocean, was asked by The Tribune to point out the comparative differences between airships and aeroplanes as shown in the remarkable flights of the NC seaplanes and the naval dirigible C-5. His article follows:

"Airships and airplanes cannot be considered as rivals. Each has a sphere of usefulness. The only dispute possible is concerning the size of these respective spheres.

"In my opinion the airship is limited by certain of its attributes:

"*First*—It must be built in larger units; therefore the cost of the smallest feasible airship must greatly exceed the cost of the smallest feasible airplane. This fact eliminates the airship as an aerial taxi or runabout.

"*Second*—It is not so easy to manœuvre as the airplane. Its drift in wind is greater and it is more the plaything of aerial disturbances than the airplane. It frequently produces a feeling parallel to seasickness. The airplane, except in case of stunts, practically never does. All this affects its desirability as a passenger conveyance.

"*Third*—It is not so speedy as the airplane, having attained a maximum air speed of only 75 miles an hour, as contrasted with 163¾ miles per hour officially credited to the airplane.

"*Fourth*—It needs a means as yet undevised for landing in a high wind, and its need for a landing field is in one sense greater than that of the airplane, since it must have a station and a crew beneath it before it can descend safely, while the flying boat, for instance, can come down even on a fairly rough sea.

"*Fifth*—While it is true that motor failure does not force the airship to descend it does send it adrift and without motor power the airship is at the mercy of the wind, while the airplane is not.

"These limitations are somewhat offset by the ability of the airship to stay aloft without the expenditure of fuel. As to how great an advantage this will be when there are airplanes with from five to nine motors, several of them always in reserve, we have yet to see."

Bids on Night Bombers

The bids for the construction of two hundred Night Bombers (Glenn Martin type) for the Army Air Service opened May 15 at the Air Service headquarters ranged in price per plane, without the two Liberty engines, from $21,000 to $37,870 per plane. Bids were received from eight companies, as follows:

Glenn Martin, Curtiss, Gallaudet, Boeing, Unit Construction, G. Elias & Co., Liberty Iron Works, and the L. W. F. concerns.

These were the bids:

Bidder.	No. of Planes.	Unit Price.	Total.
Glen L. Martin Co., Cleveland, Ohio	50	$37,875	$1,893,750
Curtiss Aero & Motor Corp., Buffalo, N. Y.	50	25,000	1,250,000
	100	21,000	2,100,000
	150	20,000	3,000,000
	200	19,500	3,900,000
Gallaudet Aircraft Corp., East Greenwich, R. I.	30	31,000	930,000
	50	30,500	1,525,000
	100	29,500	2,950,000
	200	29,052	5,810,400
Boeing Airplane So., Seattle, Wash.	50	37,750	1,887,500
Liberty Iron Works, Sacramento, Cal.	200	29,500	5,900,000
Unit Construction Co., Philadelphia, Pa.	25	34,740	868,500
L.W.F. Engineering Co., College Point, N. Y.	50	29,800	1,490,000
	100	27,800	2,780,000
	200	24,950	4,990,000
G. Elias & Bros., New York, N. Y.	1	60,000	60,000
	5	55,000	275,000
	10	50,000	500,000
	25	45,000	1,125,000
	50	42,500	2,125,000
	100	41,000	4,100,000
	200	39,750	7,950,000

In addition bids in some cases were submitted for spare boxing, etc., slightly increasing these totals. No bids have been accepted.

S. A. E. Summer Meeting

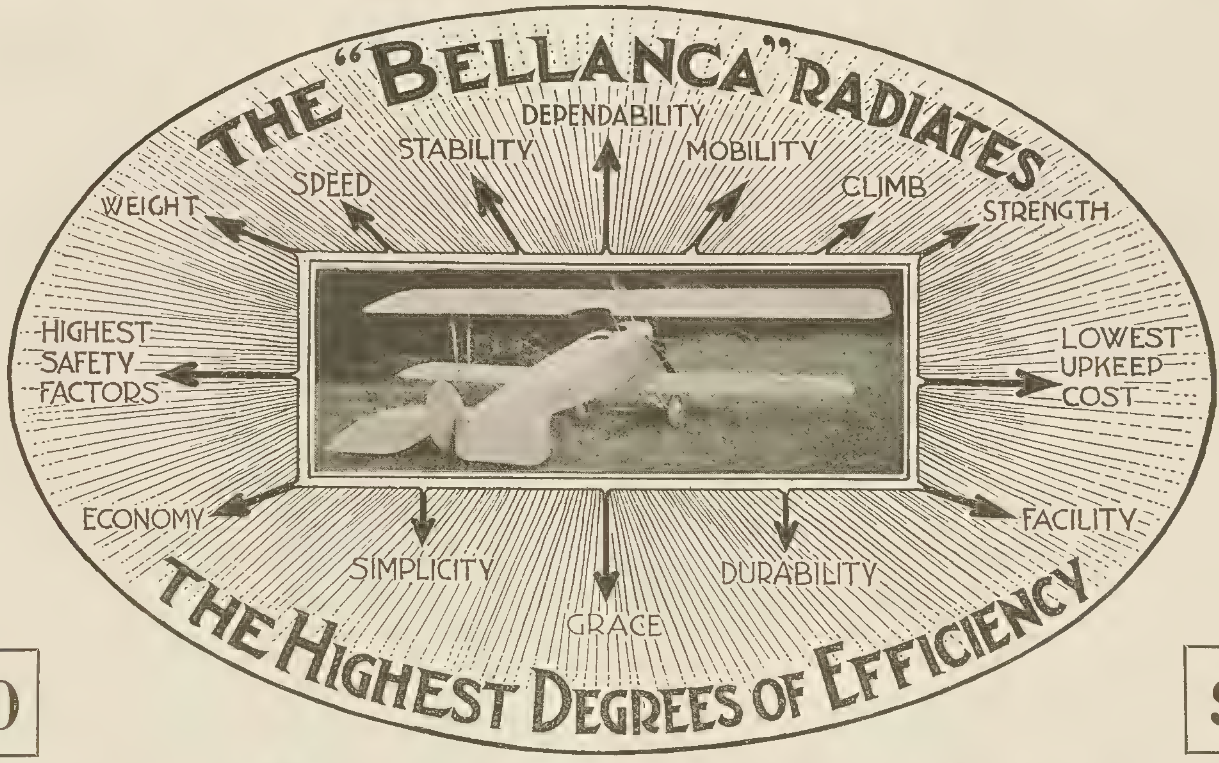
The summer meeting of the Society of Automotive Engineers will be held at Ottawa Beach, Mich., June 23-27 next. The meetings committee is headed by David Beecroft and consists of W. A. Brush, B. G. Koether, Dent Parrett, C. F. Scott and Herbert Chase, Secretary. Reservations should be made early.

Major A. P. Loening Home

Major Albert Palmer Loening, formerly Adjutant and Executive Officer of American Aviation Acceptance Park, Orly, has returned from France. Major Loening received his discharge from the Army on May 15. He will continue to be actively identified with aeronautics, having just been elected Vice-President and Treasurer of the Loening Engineering Corporation, of which his brother, Grover C. Loening, is the head.

FOURTEEN VITAL POINTS
THAT MUST DOMINATE IN THE RECORDING OF THE (AERONAUTICAL) HISTORY OF THE U. S.

14 14



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Airplane Contracts

Contracts for at least 500 airplanes of the very latest types will be awarded to American manufacturers under plans prepared by the Army Air Service and sent to Secretary Baker for his consideration as forecasted by the AIRCRAFT JOURNAL. The primary purpose would be to keep the industry in such condition as would insure its rapid expansion to meet the requirements of a national emergency.

Seven types of planes have been approved by the American Air Service as representing the most modern developments in the science of aviation. They are the Le Pere observation, the Loening monoplane, the Thomas-Morse scout, the U. S. D. 9-A day bomber, the Vought advance training plane, the Martin day bomber, and the Ordnance Engineering Corp. pursuit plane.

The contracts would be divided among these types so as to insure the maintenance of sufficient machinery and personnel at all times to permit the ready expansion for larger orders. With the exception of the Vought, all seven types were developed in the United States during the war.

To further encourage the airplane industry in the United States, air service officials are prepared to recommend that the War Department and other Government agencies lend domestic manufacturers every assistance in developing markets for their products in South and Central America.

The rapid disintegration of the airplane industry in this country from the pre-eminent position it had reached just at the time of the signing of the armistice has been viewed with anxiety by officials here. One officer expressed the opinion that if necessity arose at this time the United States would find itself in almost the same situation regarding aviation as in April, 1917, and that more than a year would be required to again bring the manufacturing facilities to the standard required.

Officers declared that the popular idea that a great surplus of aviation material exists in the United States is entirely erroneous. While hundreds of training planes are on hand, the facilities for producing service planes, especially of the latest types, according to officials, have never reached a "safe" margin of production.

Definite information that Great Britain and France are encouraging domestic airplane manufacturers to perfect the most modern designs of flying craft has reached the War Department and has strengthened the purpose of American officials to prevent this country from falling behind.

Packard Landing Field

The Packard Motor Car Company has acquired a tract of land on the outskirts of Detroit for use as a private experimental flying field in the development of its aviation program. The field lies between Detroit and Mt. Clemens; almost midway between Morrow Field in Northwest Detroit and Selfridge Field near Mt. Clemens. It is large enough to permit of the landing of any kind of airplane; it is accessible by improved highway and interurban railway; and it is easily susceptible of improvements which will be begun at once to make it a model experimental field.

Lt. Col. J. G. Vincent, vice president of engineering of the Packard Company, and one of the principal designers of the Liberty engine, is enthusiastic over the acquisition, which insures him and his staff facilities for proving out both engines and planes.

"I am tremendously interested in the installation of flying fields everywhere in America, and particularly in the neighborhood of our larger cities, between which we may expect the most travel," said Col. Vincent, "because the whole development of peace-time aviation is limited strictly by the landing-field facilities. Private companies and individuals are seeing this with increasing clearness, and communities that want their share in the development of this new form of transportation should be energetic in action right now.

"Immediately after the war, Packard announced its increasing interest in aviation, and especially in the peace-time development of the airplane, as well as in co-operation in every way with the Government's development of equipment that would have a war-time value. With this field, we shall be able to further our work in pursuit of this interest in the most practicable manner, linking our efforts with those of other private and public agencies working toward similar results.

"Our intention is to work and exchange courtesies with companies and individual aviators interested along the lines we propose to follow. For instance, at Dayton, Ohio, Col. E. A. Deeds, who was one of the chief forces in creating the American military air service, and C. F. Kettering, the eminent electrical engineer, have a private field. Mr. Kettering is doing some special work on wireless for communication between pilots and their fields, regardless of weather conditions. We shall install his apparatus at our field, and there will be frequent flights between their grounds and ours.

"Through the efforts of Messrs. Deeds and Kettering, a fine field has been established at Ohio State University, in Columbus. Prominent citizens of Detroit are supporting a movement to have the municipality take over the present U. S. Air Service field, known as Morrow field, in the Northwest outskirts of Detroit. Our project will in no way diminish the need for going through with this enterprise; rather, it emphasizes it; for a field larger than ours is absolutely necessary for certain purposes, as, for example, in making the first flights of machines. We shall try to make the most extended use of every facility, private and public, to promote the immediate development of aviation in this country."

Packard will begin immediately to grade, tile and seed the new field, and will erect buildings as they are needed. Everything ought to be ready for active operations by mid-summer. As soon as the field is ready for use it will be properly marked so that it can be located easily from the air.

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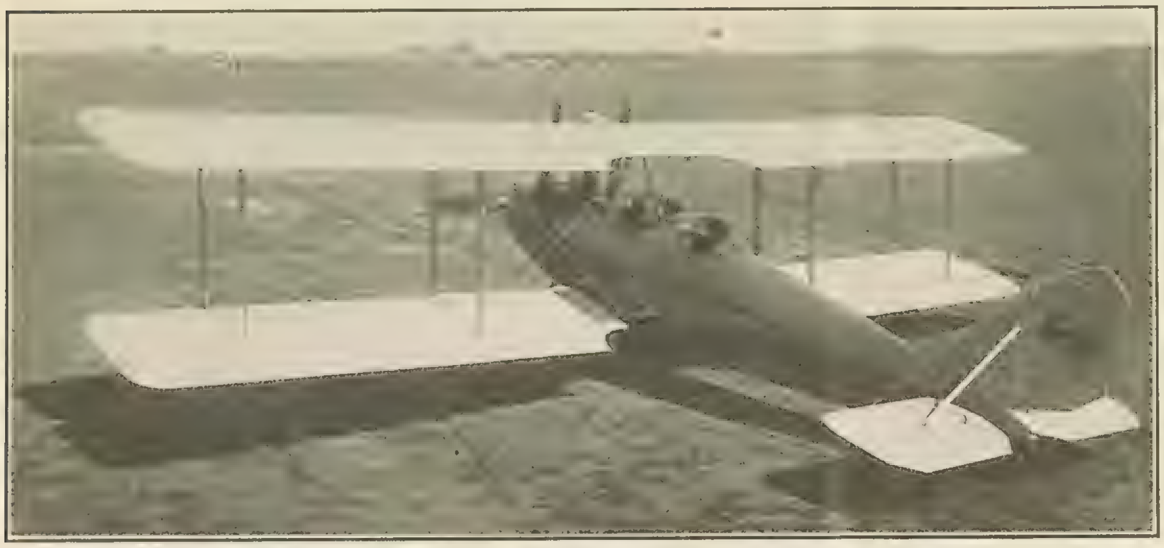
New Curtiss Oriole

The purely commercial airplane is here.

Immediately after the signing of the armistice, the Curtiss Aeroplane and Motor Corporation directed the energies of its designers toward the development of aircraft designed to meet commercial needs.

The Oriole, designed by W. L. Gilmore, airplane engineer for the Curtiss Engineering Corporation at Garden City, L. I., is the first post-bellum airplane in the world designed primarily for the comfort of passengers—the first plane which is not a war adaptation.

It is a three-passenger biplane, the fore cockpit being commodious enough for two passengers seated side by side. All the controls are in the rear cockpit.



Curtiss Oriole, a Commercial Airplane

DIMENSIONS

Complete Machine

1. Overall length	25′ 0″
2. Overall width	36′ 0″
3. Overall height	9′ 5″

Fuselage

1. Length	23′ 3″
2. Width	3′ 2″
3. Height	3′ 8″

Wings

1. Chord	5′ 0″
2. Span	36′ 0″
3. Maximum panel length	16′ 7″

Machine with Wings Detached (except engine panel)

1. Length	25′ 0″
2. Width	3′ 2″
3. Height	9′ 5″

Tail

1. Height	4′ 3″
2. Width	10′ 1½″

Landing Chassis

1. Size of wheels	26″
2. Tread	63-22/32″

Weights

1. Total weight (full load)	2188 lbs.
2. Light weight (including water)	1421 "
3. Useful load	767 "
Fuel, 43 gals	257 "
Oil, 4 gals	30 "
Pilot	160 "
Passengers or other load	320 "
4. Fuselage (with motor)	925 "
5. Tail	41 "
6. Wings	340 "
7. Landing Chassis	78 "

	Sea Level (observed)	5000	10000
High speed	85	83	80
Low speed	47.3	51.6	56
Economical speed	60	65.5	71

Climb—full load	2475 ft. in 10 min.
Rate of climb	400 ft./min.
Endurance at High Speed (miles)	365 miles
Endurance at High Speed (hours)	4.3 hours
Endurance at Economical Speed (m.)	393 miles
Endurance at Economical Speed (hrs.)	6.55 hours

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Hawker and Grieve Believed to be Lost

(*Continued from page* 10)

the soft meadow land as the momentum of the machine carried it forward, and the tail rose almost straight into the air. Both men were thrown violently forward in the cockpit. Raynham had to be assisted in crawling out and Morgan also was dazed.

As realization came that they were out of one of the most daring adventures of modern times the two shook hands silently, with despair in their faces, and hurried back by automobile to their quarters in the city. To friends Raynham made the following statement after he recovered from his temporary collapse:

"I was just beginning to get a lift. I felt the undercarriage weaken and pulled back on the control stick in an attempt to assist the machine clear of the ground, but the propeller stuck and we spilled. Another twenty-five yards and we would have been away."

Some criticism of Raynham was made by army air pilots who witnessed the start. They point out that the machine tried to take off with the light and shifty wind at times either with them or crossing their line of motion. On the other hand, had the pilot tried to take off in the opposite direction he would have been compelled to lift his heavy laden plane over some high hills which loomed not far ahead. The critics maintain that he could have done this, and that he made a serious mistake in not taking advantage of the wind.

The Martinsyde mechanics engaged in overhauling the wrecked plane say the fuselage from the first cockpit aft is undamaged but that at the junction of the fuselage with the engine, where the former covers the aluminium tank, the wooden ribs are badly fractured. The lower section of the left plane is also damaged, but spare parts for it were brought here with the machine.

Photo by Paul Thompson

Harry G. Hawker and Commander Grieve Testing the Lifeboat Forming Part of Fuselage of the Sopwith Plane

The most serious damage is to the engine, which, these experts say, in view of the shock it received, can never be trusted to fly the Atlantic, though it is still sufficiently good to justify its use for flying over land areas. The propeller is reduced to matchwood, but spare propellers are carried. The radiator is much injured, but can be replaced by a spare one. The axle of the wheels is broken, and the wheels themselves are sprung.

The Martinsyde machine cost $45,000—$30,000 for the engine and $15,000 for the rest of the machine.

Harry A. Tudor, sales manager of the Maryland Pressed Steel Co., Aircraft Department, and honorary director of the Air Pilots' Bureau, who has been for years a close personal friend of both Harry G. Hawker and Captain Raynham, said in an interview quoted in the *New York Times,* that "neither Hawker nor Raynham is a dare-devil in the accepted sense of that word, but both of them are cool-headed veterans of the air, who know every part of their machines, and who went into the great contest absolutely convinced that they would be able to accomplish the feat.

"In 1912 Hawker established a record of over eight hours continuous flight, in addition to other outstanding exploits where pluck and endurance counted. With the first announcements of the transatlantic flight being attempted, I was not disappointed in finding his name as the first entrant, and more so, that Tom Sopwith had selected him to pilot a machine of his design. Sopwith, one of the first pioneers in designing British aircraft, and second only to Alliot V. Roe, had long ago decided to capture the honors of the first transatlantic flight, and appointed Hawker, knowing that if he could build a machine to successfully accomplish the flight, Hawker could be counted on to provide the essential human element and skill.

"Raynham is regarded as the most expert test-pilot in Europe, and, like Hawker, had all the necessary experience, knowledge and physical culture to achieve success if, in his instance, he could acquire the right machine, and his selection of the 'Martinsyde' promised an exciting race if an equal start could have been effected. Knowing the character of the two men, I don't have to add that either would have abandoned the race to help the other if in danger when en route."

As this issue of Aircraft Journal goes to press nothing since their departure from St. Johns has been heard from Hawker and Grieve.

Aviation experts fear the thirty-five mile gale Hawker encountered exhausted his fuel and plunged his Sopwith into a heavy sea, where he met death before he could send out a distress call or a goodby message.

T. J. McNamara announced in the House of Commons May 20 that every available ship had been ordered to search for the missing aviator and his navigator, MacKenzie Grieve.

Frederick P. Raynham, who was injured when his Martinsyde airplane was wrecked, has announced that the machine would be repaired and he would attempt the overseas flight. The Handley Page and Vimy machines are being assembled for the "hop off."

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Designers and Contractors to U. S. Army and U. S. Navy

American Air Mission En Route to Europe

(*Continued from page 5*)

"In what I have described to you as their mission, I do not want to limit it in any way. I am asking Mr. Crowell and his associates to get all the information they can on the development of aircraft and the plans there are abroad among civilized peoples for the development of the airship as an instrument of civilization, whether for war or for peace service, and as far as they can I hope they will collect all this information and bring it back and make a report, and perhaps make exhibits which we can lay before any committee of Congress which is interested in the subject, whether it is the Military Committees dealing with the airplane as an implement of war, or whether it is any other Committee dealing with it as an implement of commerce and industry.

"All countries have developed aircraft, but this development has been for the most part along military lines, and now we must find an industrial use in order to see that the development goes on. These questions have been studied abroad—very elaborate studies have been made in Great Britain—and one or two conferences have already been called in Europe, to which the United States was invited to send delegates—one of the conferences, was I think on standardizations. In addition, conferences have been called for amendments to the law of the several countries, for recommending amendments, that will deal with the Admiralty Law of the air—rules for preventing collisions and fixing responsibility for collisions. These conferences will probably be attended by Mr. Crowell, if he is in Europe at the time they are held, and any recommendations for the consideration of the Congress will be brought back by him."

Civilian Members

With the aeronautical careers of the civilian members of the commission readers of the AIRCRAFT JOURNAL are familiar, with the possible exception of Mr. Keys, who was born in 1876 at Chatsworth, Ontario and is the son of Rev. George Keys; graduated, Toronto University, 1897; came to New York, 1901; reporter and editor, *Wall Street Journal*, 1901-1906; editor, *World's Work*, 1906-1912; bond business, independently, 1912-1918; vice-president, Curtiss Aeroplane & Motor Corporation; treasurer, Curtiss Engineering Corporation; chairman, executive committee, British & Canadian Patriotic Fund.

Photo Harris & Ewing

Capt. Henry Coskey Mustin, U. S. N.

Mr. Keyes resides at Glen Ridge, N. J.

Following are brief sketches of the Army and Navy members.

Capt. Henry C. Mustin, U. S. N.

Capt. Henry Coskey Mustin has for some time been very active in the advance of the new science and industry. He will represent the U. S. Navy.

His has not been the operations end but the construction end of this work in the Navy. As an officer in the Bureau of Construction and Repair, Captain Mustin, has been instrumental in a great amount of designing and building of the Naval flying boats and seaplanes. He was born in Pennsylvania, February 6, 1874, and entered the Naval Academy in September, 1892 from Tennessee. At the age of twenty-two he graduated and entered active service as a midshipman in the U. S. Navy. Most of his service has been on the shore where he has for many years served in the Bureau of "C. and R." He was commissioned as a Commander three months after the declaration of War and during the war rose to the rank of Captain. Of late years he has devoted the greatest part of his time to the development of Naval aircraft.

Lieut.-Col. James A. Blair, Jr.

Lieut.-Col. James A. Blair, Jr., though not connected directly with military aviation in this country, was one of the few men of who immediately took an active interest in the progress of aviation, beginning with the achievements of the Wrights. It is said that he was one of the first civilian passengers carried aloft in an airplane.

He is a resident of New York, and a member of Blair and Company. With the declaration of war, he offered his services to the War Department, and was appointed as the representative of that Department on the Shipping Board. There he was

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given multitudinous duties, among them the organization of the secret service and the policing of the many ship-yards of the country. He efficiently organized these services for the protection of America's ship-building industry from fire and damage by alien enemies. Later he was commissioned as a Lieut.-Colonel on the General Staff and for several months has served as assistant to the Assistant Secretary of War. Lieut.-Col. Blair was one of the first members of the aeronautical commission about to set out for Europe, to be selected by Mr. Crowell. Lieut.-Colonel Blair is about 37 years old.

Col. Halsey Dunwoody

Col. Halsey Dunwoody, Chief of the Air Service Supply Service, who already is in France will be attached to the mission as soon as it reaches France.

Colonel Dunwoody, was Assistant Professor of Natural and Experimental Philosophy at West Point, with the rank of Captain, Coast Artillery Corps, when the war broke out. He was a man of high scientific attainments, and early in the first year of the War, General Squier asked that he be assigned to the Aviation Section of the Signal Corps. This was done, and he was appointed a Lieut.-Colonel in the Signal Corps, temporarily, in August 1917. Colonel Dunwoody was sent to France in October, 1917, where he organized the entire Air Service Supply System, a gigantic task, entailing the procurement not alone of planes, but accessories, spare parts, motors, oil, gas, equipment, etc., for several types of planes. Our planes were coming from France, Great Britain and the United States, and no two types were alike, which necessitated furnishing a dozen different kinds of parts and equipment to keep these planes in the air. The responsibility was tremendous, but Colonel Dunwoody carried out his work of organization and supply so well that recently he was awarded the Distinguished Service Cross "for his energy, tact and executive ability; he built up an efficient supply service capable of meeting the program for material, airplanes, motors and equipment."

He became a Colonel within a year and was recommended as a Brigadier General just at the close of hostilities.

Colonel Dunwoody is the son of Brigadier General Henry C. Dunwoody of Washington, D. C., and at the age of twenty years entered the Military Academy, from which he graduated and was commissioned a second lieutenant of Artillery in June 1905. He soon rose through the rank of first Lieutenant of Artillery to Captain in the Coast Artillery Corps, and in 1915 became an assistant professor at the Military Academy, where he was detailed at the beginning of the war. It is upon him that Mr. Crowell will depend to a large extent for his information overseas.

Photo. Harris & Ewing

Lieut. Col. James A. Blair, Jr.

Chicago-Cleveland Mail

Daily air mail service between Chicago and Cleveland was started May 15 when 'planes left both cities simultaneously and made the 350-mile trip without incident.

The first 'plane left Chicago at 9:35 o'clock, piloted by Trent C. Fry. It was a machine of the De Haviland 4 type, carrying a mail bag weighing 450 pounds. It arrived in Cleveland at 12:48 p. m., making the trip from Chicago in three hours and thirteen minutes, including a five-minute stop at Bryan, Ohio.

The 'plane which left Cleveland at 10:30 o'clock, piloted by Edward Gardner, took the air at Woodland Hills Park and followed the New York Central tracks to the west, reaching Bryan, Ohio, at 11:15 and South Bend at 12:40 o'clock. It arrived in Chicago at 1:25 p. m. The trip consumed three hours and fifty minutes.

Eclipse Plane Pictures

Prof. David Todd of the Amherst College astronomical observatory will observe the solar eclipse on May 29 from a naval airplane at an altitude of 10,000 to 11,000 ft. in order that he may obtain some clear pictures of the solar corona. He sailed May 13 on the American steamship Elinor for Montevideo, and has arranged with the steamship company for the vessel to go somewhat out of her course in order that the observations might be made on the eclipse, which will last six minutes and 50 seconds.

Prof. Todd's plan is an innovation in astronomical observations, and he expects excellent results

"THE SEAGULL"—Sport Seaplane

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NC Boats Built to Fight Submarines

(*Continued from page* 9)

for over an hour prior to the start of the flight, and is probably the first man to deliberately stow himself away on an airplane in order to make a voyage. On these flights Naval Constructor Richardson was in charge and was one of the pilots.

After making various minor improvements, it was concluded that the maximum which could be obtained from three Liberty engines had been reached and no further improvements in performance could be expected until a geared Liberty became available. It was believed that the geared engines were still in an experimental stage. It was apparent, however, that the flying part of the craft could sustain a greater load if more power were available, and it was accordingly decided to add a fourth engine, making a total of four Liberty engines. The second boat completed designated as NC-2 was therefore fitted with four Liberty engines arranged as two pairs of tandems and on its trials in March, 1919, successfully flew with a total weight of 28,000 lbs. The addition of the fourth engine, which increased the dead weight of the boat by about 1500 lbs., permitted about 3300 lbs. of extra weight to be carried, or a net gain of 1800 lbs.

NC-3 and 4 Completed

The NC-3 and NC-4 were completed in April, 1919 and were likewise fitted with four high compression Liberty engines, but with a somewhat different arrangement. In these two boats two engines were arranged on the central line as a tandem pair with the other two engines mounted on the wings as tractors, as were the wing engines on the NC-1. In these boats a further change was made by omitting the center nacelle and placing the pilots in a cock-pit in the hull.

These boats as completed and equipped with oil instruments, cooling water, and fixed accessories, weighed just under 16,000 lbs., and when fully equipped with crew, radio, food and water, spare parts and with fuel and oil for a flight of 1400 sea miles weigh 28,000 lbs. The useful load carried is, therefore, over 43 per cent. With the full load of 28,000 lbs. the boats make a speed of 85 miles per hour and leave the water easily. At the average loading of 24,000 lbs. the full speed is 95 miles per hour.

Due to injury to two outer wing sections while at anchor in a gale late in March the NC-1 was put temporarily out of commission. After the completion of weight lifting trials on the NC-2, the outer wing sections of that boat were transferred to the NC-1 as no spare wings were available. Except for this regrettable injury, all four of these boats would have been able to leave Rockaway Beach together for the trans-Atlantic flight.

French Air Casualties

The casualties in the French air service in the war zone during the war were 6,328, it is officially announced in Paris. The casualties were divided as follows:

Killed, 1,945; wounded, 2,922; missing, 1,461. Of the missing, it is stated, 700 must be considered to have lost their lives.

Outside the war zone the casualties totalled 1,227, bringing the aggregate for the whole service to 7,555.

Radio for the A. F. C.

The American Flying Club, 11 East Thirty-eighth Street, has now a radio outfit with which the members hope to keep in touch with aircraft flights at a great distance. The outfit was installed on the clubhouse roof by Lieutenant Russell of the Signal Corps, U. S. Army, and is the only one of its kind, so far as the members know, that has been officially sanctioned.

The club's president is Lawrence L. Driggs and its honorary president Gen. Charles T. Menoher, Director of the U. S. Army Air Service. Many noted air fighters are among the members. It has no connection with any other organization.

War Service Chevrons

The Secretary of War has issued directions that the computation of time for overseas war service chevrons shall include all time from the date of departure from the Port of Embarkation, U. S. A. to date of arrival at Port of Debarkation, U. S. A., both dates inclusive.

Cross Country Recruiters

Five De Haviland airplanes left Love Field, Dallas, at one o'clock May 15 on the first leg of a cross country army recruiting flight to Boston, with Oklahoma City the first scheduled stop, which they reached in two hours. Coloned H. D. Claggett, commanding the squadron, landed first.

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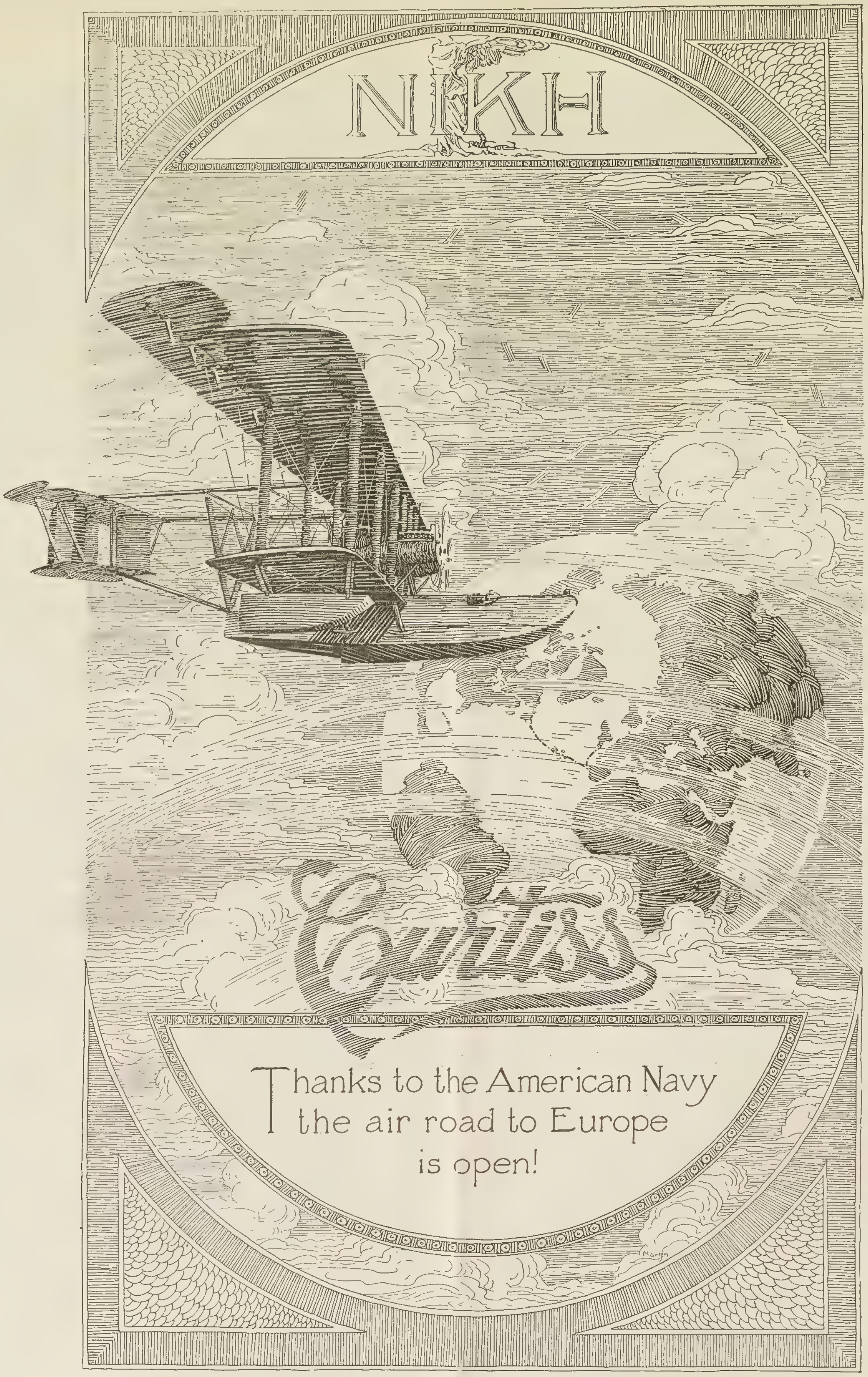
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AIRCRAFT JOURNAL

May 31, 1919 Every Saturday Price Ten Cents

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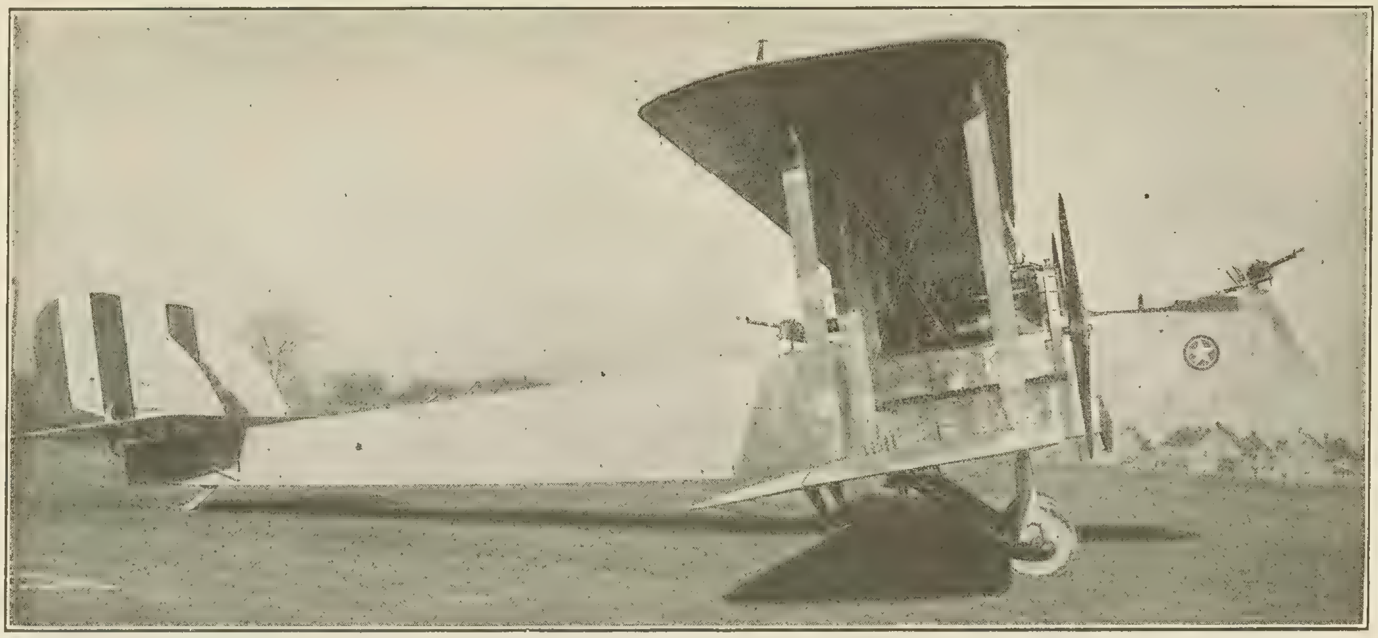
Commander Albert Cushing Read, U. S. N.

Commanding the NC-4, First Plane to Accomplish the Trans-Atlantic Flight



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America First to Fly the Atlantic

Commander Albert Cushing Read, U. S. N., on the NC-4 Flew from Trepassey Bay, N. F., to Lisbon, Portugal, in 26h. 41m.

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America first! Leaving Ponta Delgada at 6.18 A. M. May 27 (New York time) the NC-4, commanded by Commander Albert Cushing Read, U. S. N., alighted in the harbor of Lisbon, Portugal, at 4.01 P. M. (New York time), flying 920 miles at an average speed of 82.7 m.p.h.

U. S. Navy First

While details are left for a later issue the outstanding fact that the Atlantic ocean was first crossed in a flying machine by an American, in a machine distinctly American, is no longer a subject of controversy.

In these introductory words it is proper to say that America's achievement is primarily due to (making full allowance for the skill and courage of Commander Read and his crew):

CONSTRUCTION

Rear-Admiral D. W. Taylor, U. S. N.
Commander J. C. Hunsaker, U. S. N.
Commander G. C. Westervelt, U. S. N.
Commander Holden C. Richardson, U. S. N.

ORGANIZATION AND OPERATION

Commander John H. Towers, U. S. N.
Commander P. N. L. Bellinger, U. S. N.
Commander Albert C. Read, U. S. N.

Perhaps in front of these names it would not be improper to place the name of Glenn H. Curtiss, civilian, the man who first conceived the idea of the flying boat, and whose coöperation with the Navy throughout the development of the NC (Navy-Curtiss) seaplanes has led finally to America's aviation triumph.

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Handing Food and Water to the Chief Machinist's Mate on the NC-4

No Comparison Possible

It is a far cry from Lyme, up in the Granite state, to Lisbon yet it was a still further cry, more than four hundred and twenty-five years agone, from Palos, Spain, to one of the Bahamas, and there is no even comparison of the two accomplishments possible.

Columbus still stands in a class by himself—but no one quality that he had was lacking in the New Hampshire man.

If the British attempt to fly the Atlantic was less successful, though more spectacular, full credit should be given to the men who tried—Hawker and Grieve and others.

Actual Flying Time

The actual flying time of the NC-4 from Trepassey Bay to Lisbon, was 26 h. 41 min., and from Ponta Delgada to Lisbon, 9 h. 41 min.

Commander Read, upon his arrival in Lisbon, stated that he would proceed to Plymouth, England, the moment flying conditions were favorable.

Opinions of the Flight

In response to an inquiry addressed by the Aircraft Journal to several leaders in the development of aeronautics, military, naval and commercial, asking what they think the accomplishment of the trans-Atlantic flight by the NC-4 means to civilization, these replies have been received:

Gen. Charles T. Menoher, D. A. S.

Reference your telegram regarding trans-Atlantic flight I am of the opinion that the trans-Atlantic flight can be classed with land and ocean telegraphy, telephone, and wireless in the advancement of civilization, and the airplane will from now on be recognized as the equal of any invention that has contributed to the annihilation of time and distance in the matter of transportation.

Charles T. Menoher,
Director of Air Service.

Washington, May 27, 1919.

Admiral D. W. Taylor, U. S. N.

(Bureau Construction and Repair)

In reply to your telegram: I am not enough of a prophet to answer your question as to the meaning to civilization of the NC flying boats. However, to an engineer it seems to be demonstrated that engineering principles are being successfully applied to the conquest of the air and that progress in the art must continue, as it always does, when the problem is reduced to the application of such principles.

D. W. Taylor.

Washington, May 27, 1919.

Col. Thurman H. Bane, A. S. A.

(Chief of Technical Section)

The accomplishment of the trans-continental flights by the NC-4 will have an effect upon civilization of the same nature of that experienced by the substitution of the steam-boat for the old sailing craft.

It is thought within a very short time the trans-continental flights will become quite frequent, within two years regular schedules by both aeroplanes and airships will be in existence. This will mean that the business man can get from Chicago to London or Paris in two or three days. This of course will do much to unite Europe and America in a business way.

The fact that the flight itself is accomplished should forever quiet people who claim that the Liberty Engine is worthless. An engine that can make such a trip is certainly a wonderful engine.

T. H. Bane,
Colonel, A. S. A.
McCook Field, Dayton, O., May 27, 1919.

C. F. Kettering

(Former President Society of Automotive Engineers)

The greatest advancements in civilization have been made through advancements in transportation and communication. Surely, this first trip by air across the ocean stands as the first milestone in the great future of aerial navigation, which is destined to be the greatest servant of man. This method of transportation will make people citizens of a world rather than of a country.

Boundary lines of nations and limitations of human activities have been prescribed largely by the limits of transportation. With these once removed, no one can predict along what lines developments will come.

The developments of the wireless telephone and the trans-Atlantic flight stand as the greatest in the developments of the world's commercial aviation. Improvements will come in both of these and no one can venture a prediction as to what extent these will enter into the world's future activities.

C. F. Kettering.

Dayton, O., May 27, 1919.

Lieut. Col. J. G. Vincent

Your telegram reaches me at time when I am extremely busy getting things cleaned up so I can get away for trip to Europe. I am much pleased with Navy's wonderful work, which has resulted in showing the world what an airplane can do. It is, of course, obvious that much remains yet to be

(*Continued on page* 12)

Hawker and Grieve Rescued in Mid-Ocean

Signalled a Tramp Steamer Which Picked Them Up and They Now Are Safe in London

Missing for six days and virtually given up for lost, Harry G. Hawker and his navigator, Lieut. Commander Mackenie Grieve, the British airmen who essayed a flight across the Atlantic Ocean without protection against disaster save what their frail airplane afforded, are safe.

Some one thousand and fifty miles out from Newfoundland and 850 from the Irish Coast, on Monday, May 19, the aviators making the best of an engine which was failing to function properly, were forced to alight on the water. The little Danish steamer Mary, bound from New Orleans and Norfolk for Aarhuus, Denmark, picked the wayfarers up and continued on her northward voyage.

No Wireless Outfit

Lacking a wireless outfit, the captain of the steamer was obliged to withhold the good tidings of the rescue until he was opposite Butt of Lewis, where the information was signaled, by means of flags, that Hawker and Grieve were aboard his ship.

Immediately word was flashed to the British Admiralty, which sent out destroyers to overtake the Danish vessel and obtain absolute confirmation. This was done, and one of the destroyers took the airmen off and later transferred them to the flagship Revenge.

From the Revenge, Hawker sent the following message to the *Daily Mail*:

"My machine stopped, owing to the water filter in the feed pipe from the radiator to the water pump being blocked with refuse, such as solder and the like, shaking loose in the radiator. It was no fault of the Rolls-Royce motor, which ran absolutely perfect from start to finish, even when all the water had boiled away.

In Water for Ninety Minutes

"We had no trouble in landing on the sea, where we were picked up by the tramp ship Mary, after being in the water for ninety minutes. We leave Thurso at 2 P. M. Monday, arriving in London Tuesday evening."

It was officially announced by the Admiralty that the aviators were picked up in latitude 50.20, longitude 29.30, having alighted close to the little Danish steamer. The airplane was not salvaged.

The first report of the aviators since their famous "jump off" last Sunday came when the Mary rounded Butt of Lewis, the northernmost point of the Hebrides Island, and signaled the fact that she had Hawker and Grieve aboard.

"Saved hands of Sopwith airplane," was the signal.

"Is it Hawker?" was the question sent out by the flags from the Butt.

"Yes," laconically replied the Mary.

The Admiralty immediately sent out a fast torpedo boat destroyer in an endeavor to intercept the Mary and take off the aviators. There was an anxious wait of several hours, when the word was flashed that the destroyer had come across the steamer and transferred Hawker and Grieve and was taking them to Thurso, on the northern coast of Scotland, about 100 miles east of Butt of Lewis.

The destroyer Revenge reported to the Admiralty later that Hawker and Grieve would sleep on board and would reach London at 7 o'clock Tuesday evening.

The London *Daily Mail*, which offered the purse of $50,000 for which Hawker and Grieve were flying, will give Hawker and Grieve a consolation price of $25,000.

All Britain Electrified at News

The news of the rescue has electrified all Britain. Eight destroyers after a thorough search of the Atlantic for 300 miles from the Irish Coast had given up the quest, and there was practically no hope that the airmen were alive.

The modest Hawker home near Surbiton was quickly the centre of interest says a London cablegram. Crowds of people swarmed there. Mrs. Hawker, who had only on Saturday received a telegram of condolence from King George, said:

"I had a presentiment all along that I should see my husband again. I was confident all the time, although every one condoled with me. I am overjoyed and too overcome to talk now."

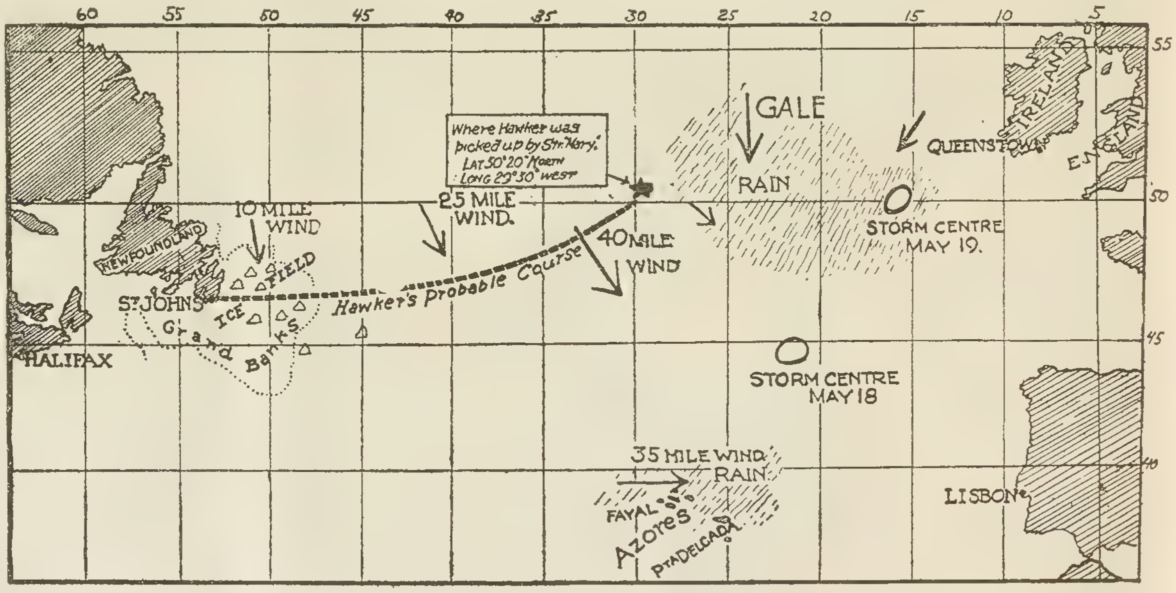
She posted a notice outside her home, reading: "Mr. Hawker has been found. He is on the boat Mary, bound for Denmark."

Hawker's Story

Hawker and Grieve landed at Thurso, Scotland, May 26. Hawker told his story simply, as follows, to the London *Daily Mail:*

"We had very difficult ground to rise from on the other side. To get in the air at all we had to run diagonally across the course. Once we got away we climbed very well, but about ten minutes up we passed from firm, clear weather into fog.

"Off the Newfoundland banks we got well over this fog, however, and, of course, at once lost sight of the sea. The sky was quite clear for the first four hours, when the visibility became very bad. Heavy cloud banks were encountered, and eventually we flew into a heavy storm with rain squalls.



Map showing weather conditions on the Atlantic Ocean along Hawker's course during the flight, compiled from data furnished by the United States Weather Bureau

"Then it was we reached the fateful decision to play for safety. We changed our course and began to fly diagonally across the main shipping route for about two and a half hours, when, to our great relief, we sighted the Danish steamer which proved to be the tramp Mary.

"We at once sent up our Very light distress signals. These were answered promptly, and then we flew on about two miles and landed in the water ahead of the steamer.

Impossible to Salve Machine

"The sea was exceedingly rough, and, despite the utmost efforts of the Danish crew, it was one and a half hours before they succeeded in taking us off. It was only at a great risk to themselves, in fact, that they eventually succeeded in launching a small boat, owing to the heavy gale from the northeast which was raging.

"It was found impossible to salve the machine, which, however, is most probably still afloat somewhere in the mid-Atlantic.

"Altogether, before being picked up, we had been fourteen and a half hours out from Newfoundland. We were picked up at 8.30 (British Summer time).

"From Captain Duhn of the Mary and his Danish crew we received the greatest kindness on our journey home. The ship carried no wireless, and it was not until we arrived off the Butt of Lewis that we were able to communicate with the authorities.

"On climbing aboard we found that Captain Duhn spoke very good English. He had been afraid we should go down before his boat reached us.

"'Another hour,' he said as we went on the bridge, 'and you would have gone down.'

"He thought we were Americans, and we were struck by the casual manner in which he took the whole business, as if it were an every day affair to take airmen out of the Atlantic.

"We immediately asked him his bearings and what likelihood there was of meeting a ship that day or the next, and of being in the main route of shipping.

"At that time he thought there would be a very good chance of seeing a ship with wireless at any moment. That night the storm got worse and we had to heave to, only making about a knot in a northerly direction, thus taking us off the shipping route and lessening the chance of meeting another ship.

(*Continued on page* 14)

AIRCRAFT JOURNAL

Member of the Audit Bureau of Circulations

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The Gardner-Moffat Company, Inc.
Publisher

Hartford Building, Union Square
22 East Seventeenth Street, New York

Telephone, Stuyvesant 4552

Navy Free-Balloon Race from Akron, Ohio

Winning Ship, Piloted by Lieut. P. D. Collins and Ensign C. A. Palmer, Aloft 21 Hrs. 9 Min.

Wartime experiments have resulted in great improvements in the design and construction of free-balloons.

This was demonstrated in the Navy free-balloon race which started from the local naval aviation field in Akron, Ohio, May 11, and ended the next day at points along the Atlantic coast in Maryland, Delaware and New Jersey. There were seven entries.

The winning balloon, piloted by Lieut. P. D. Collins and Ensign Clarence A. Palmer, was in the air 21 hours and 9 minutes, traveling 420 miles from Akron to Ocean City, Md. With favorable winds, Collins and Palmer estimated they could have covered over twice the distance that won for them.

Officers at the naval station here conducted the race to get additional data on air currents over land and the action of balloons kept in the air for a long period.

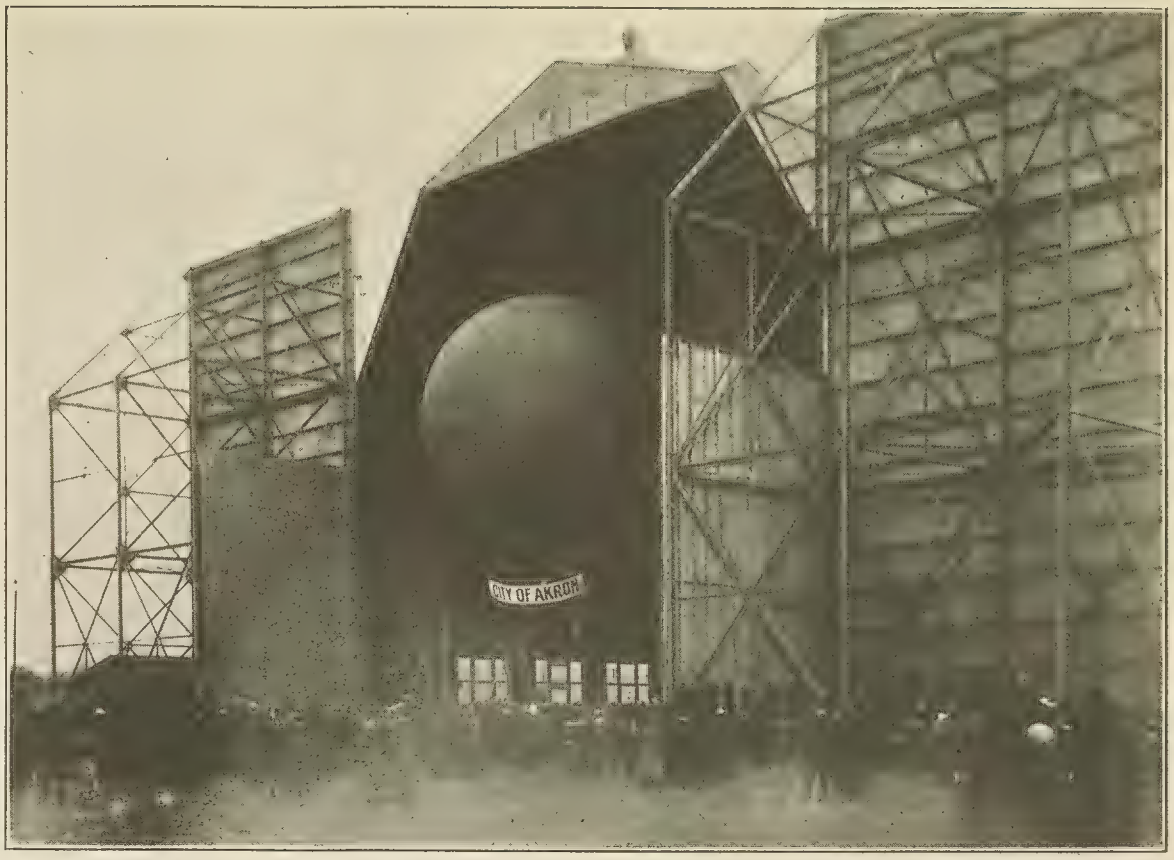
In reporting to the officers, the winning crew said they made the best headway at an altitude of 3,500 ft. Other balloons rose to 6,000 ft. and maintained that height most of the way.

The pilots sought air currents which would have carried them northeast over the New England states, but none was successful in the attempts to take that direction. The prevailing winds carried them due east toward the coast.

"The weather conditions were ideal, but the air currents in which our balloon floated were due east and we could find no deflection in this course at any altitude," said Ensign Palmer in describing the trip.

"When we neared the Atlantic coast in Maryland, we dropped to 400 ft. We went so low at times that we could talk to people on the ground below. When we sighted the ocean, we dropped to earth and the balloon landed in a swampy field. It was the best we could do."

Ensign Palmer won a rather unique distinction in that he defeated his tutors, who also were entered in the race. C. H. Roth, one of his instructors, landed at Millsboro, Del., after covering 400 miles. H. W. Ross, another tutor, landed near Clayton Del.

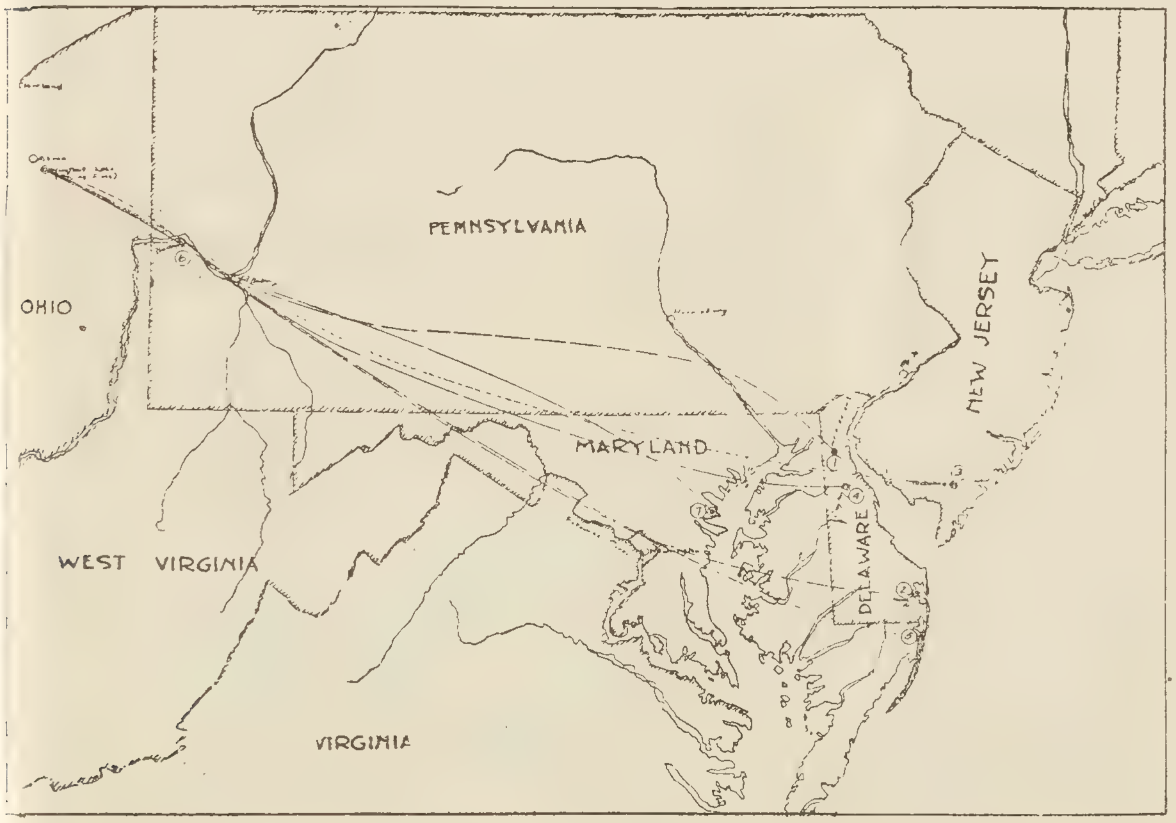


City of Akron balloon being taken from hangar just before the Navy free-balloon race

C. W. Seiberling, millionaire rubber manufacturer, who was a passenger in one of the balloons, has become an enthusiastic advocate of free-balloon trips.

The landing near Millsboro, Del., furnished the distinguished passenger a few thrills. The basket first struck an apple tree and then crashed into a barbed wire fence before stopping. None was injured.

Entries in the race and the pilots were: Chamber of Commerce (Ross); Goodyear (Roth); Navy Construction (Rodegarts); Gammeter (Hykes); Ex-Navy Men (Palmer); Sherwin-Williams (Howarth), and Navy Training (Hoyt).



Showing routes of the contestants

Balloon Lands on Roof

For the first time in the history of flying in America a vehicle of the air was brought to a convenient stop in the heart of a large city when the Army dirigible balloon landed on top of a Cleveland hotel on Friday, May 23, to permit two of its five passengers to alight. The 160-ft. dirigible, the A-4, landed on a specially constructed platform 30 by 30 ft. The landing was made after seven attempts.

The balloon, piloted by James Shade, made the trip from Wingfoot Lake Naval air station, near Akron, approximately 35 miles, in a little more than one hour, despite the fact that it faced stiff winds.

Ralph H. Upson, winner of the last international balloon race, which was held at Paris in 1913, and Major C. H. Maranville, commanding officer at the Army training station at Akron, were the passengers who alighted after the dirigible had landed.

Mr. Upson addressed the Society of Automotive Engineers.

The A-4 was built this year by the Goodyear Tire and Rubber Company in Akron, where Mr. Upson is aeronautical engineer. It has a gas capacity of 95,000 ft.

New Air Mail Pilot

Capt. Clifford A. James has been appointed pilot in the Air Mail Service. Captain James was attached to the R. F. C. Vimy to Arras on September 22, 1918, and was decorated for services overseas.

Notes on Technical Aeronautics

The Helicopter as a Possible Type of Flying Machine

The development of the flying machine has been concentrated almost entirely on the airplane, and as a consequence the potentialities of other types of heavier than air craft such as the helicopter have been largely ignored if not forgotten. At the present time the aeroplane is the only practical solution of the heavier than air flying machine, and as such necessarily embodies in its design the results of an enormous amount of previous work. Development tends to run very much in a groove. But the practical utility of the aeroplane is limited in some respects, such as in rising and landing, and it is here that it may be possible for other types of craft to excel.

Airplanes as at present understood will always be faced with the difficulties attendant upon rising and landing, especially the latter. If the wing loading is decreased and the wing section given a larger camber in order to be able to land at a slow speed, the maximum flying speed suffers immediately as the result. To be of any practical value, the airplane must be capable of flying at a certain speed when all out, and this for a given engine immediately settles the landing speed. And if we are to be able in the future to rise and land from any restricted area, the airplane will either have to be so modified as to virtually cease to be an airplane at all, or a radically different type must be adopted in its place.

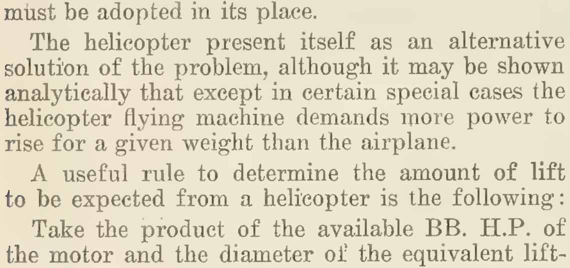
The helicopter present itself as an alternative solution of the problem, although it may be shown analytically that except in certain special cases the helicopter flying machine demands more power to rise for a given weight than the airplane.

A useful rule to determine the amount of lift to be expected from a helicopter is the following:

Take the product of the available BB. H.P. of the motor and the diameter of the equivalent lifting circle in feet. Raise this product to the two-thirds power and multiply the answer by 9. This will give the net weight in lbs. that can be lifted. The value 9 is that which can be obtained by intelligent design. The diameter of the equivalent lifting circle is the diameter of the circle which has an area equal to the area of the blades of the lifting screw when seen in plan.

The climbing speed of a helicopter will generally be lower than that of the airplane of equal B.H.P.-weight ratio, and such question as the calculation of ceilings, rate of climb, etc., may be worked out with a very fair degree of accuracy from our present knowledge of airscrews.

What, however, is going to happen on the descent when the engine stalls. This question is usually considered as the final answer to the helicopter. As a matter of fact the helicopter when falling freely will always attain what the mathematicians call a terminal velocity of descent, and from an engineering point of view the problem is then immediately simplified into questions of the safe limiting speed for ordinary use. Imagine two airplanes executing a spiral glide, coupled together at their adjacent wing tips by a sufficiently long weightless rod. The analogy with the helicopter falling should be at once apparent.



Most airplanes glide at an angle of 1 in 8 or 1 in 10 at speeds of from 60 to 100 miles per hour. The velocity of the fall vertically will then be in the neighbourhood of 8 to 10 miles an hour, and this is the velocity which would be acquired by anyone jumping off a wall 2 to 3 feet high.

Parachutes commonly fall at anything from 12 to 16 feet per second which is of the same order of figures.

Consider for a moment what occurs initially when a helicopter is allowed to fall freely from rest. The lifting screws, being free to rotate, and being inclined, commence to revolve by the action of the relative wind striking them as the machine commences to accelerate downwards. After a time the drag resistance of the screw blades causes the screw to reach a terminal angular velocity, at which speed they continue to rotate uniformly until the helicopter reaches the ground.

Whilst rotating the screws are exerting sufficient upward force or lift to prevent the machine falling like a stone. That such may be the case is easily demonstrated.

It is known that any body falling freely under the action of gravity stores up a definite quantity of kinetic energy capable of doing work. If a body of weight W lbs. falls a distance of S feet it will store up energy equal to WS foot lbs. Now let the same body by some means be caused to rotate in a plane perpendicular to the axis of a fall, then the energy possessed by the body will be the sum of its rotational energy and its falling energy. But this energy has been supplied by gravity, and for a given distance of fall is a constant quantity for a given weight of body. We have therefore the equation

Rotational energy plus Kinetic energy equals Constant

or

Kinetic energy equals a constant minus rotational energy.

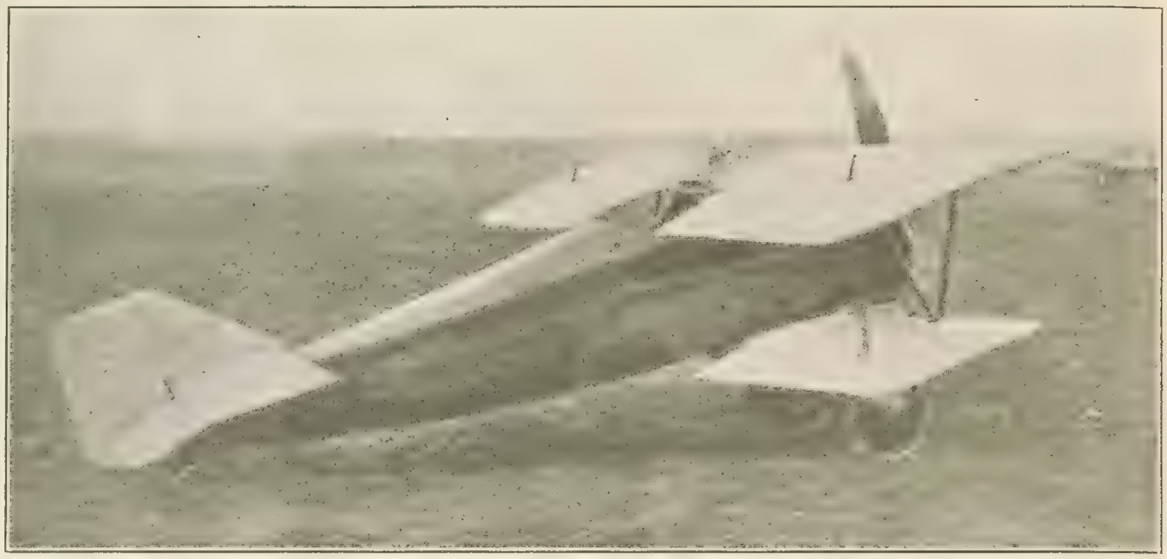
It is obvious, therefore, that the bigger the rotational energy the smaller the kinetic energy, and ergo the smaller the velocity of fall.

It would appear from the foregoing that we have only to make the rotational velocity sufficiently high to prevent the helicopter from falling at all. This apparently paradoxical result is explained by the fact that the maximum angular velocity that it is possible to impart to the system is a function of the design of the helicopter itself and hence the terminal velocity depends upon the type of machine employed.

The question of horizontal flight in a helicopter is another and somewhat complicated problem, although it is by no means impossible to overcome its difficulties. Enough has been said to show that the helicopter should not be entirely overlooked.—(*Aeroplane, March,* 1919.)

A Small Sporting Machine with an 80 Le Rhone Engine

An interesting design has been recently described in Flight of a sporting machine built round the 80 hp. Le Rhone engine. The span is only 20 ft. and the overall length is 16 ft. 6 in. A wing section of high lift rather than speed properties has been designed, nevertheless it is claimed that the machine can make a maximum speed of 102 m.p.h. at ground level, with a landing speed of 40 m.p.h. The areas of the planes are 83 sq. ft. for the upper plane and 47 sq. ft. for the lower plane with ailerons on the upper plane only of a total area of 16 sq. ft. The stabilizer is 19 sq. ft. and of the elevators 10 sq. ft., vertical fin 3¾ sq. ft. and rudder 5½ sq. ft. The gap is about 2 ft. 9 in. and the chord 4 ft. 6 in. and 3 ft. for the upper and lower wing respectively. The appended photographs show a pleasing looking machine. The N strut arrangement is a feature tending towards simplicity at the expense of a little more weight.



Type of small sporting machine

Flying in England

According to the London *Times* the London public seems not to be deterred by poor weather or the alleged risks of flying.

"All sorts of people were taking the opportunity of flying, and many tickets had already been sold by midday. These tickets are available for any one of the four days of the holiday, and as many have been sold to women as to men. Parties of three and four were also being made up, and there was a brisk demand for insurance at the rate of 5s, for £500 against death and 5s, for £250 in case of injury. But that fact did not indicate any real nervousness on the part of passengers, among whom were quite a number of elderly people. The machines to be used will be much as they were in wartime, and passengers will be able to discover for themselves, without the joy that may spring from dropping bombs on the foe, what are the sensations of an observer in a fighting 'plane.

The World's Airplanes and Seaplanes—S. V. A. Single Seater

Group IC—The S. V. A. Single Seater

The S.V.A. was one of the most successful pursuit machines used by the allies. It was developed by the Italians and was used extensively on the French and Italian fronts. It represents one of the first attempts to use high powered motors in single seater machines.

POWER PLANT

S.P.A., type A-6, 6 cylinders in line.
234 hp. at 1700 r.p.m.
Fuel tank 41 gal. Oil tank 3½ gal.

MAIN DIMENSIONS

Span 30 ft.
Chord (each plane) 5 ft. 3 in.
Overall length 26 ft. 7 in.
Gap of main planes (tips) 4 ft.
Gap of main planes (center) 5 ft. 3 in.
Area of upper wing with ailerons 137.91 sq. ft.
Area of lower wing 94.81 sq. ft.
Area of ailerons (upper plane only) 27.2 sq. ft.
Area of horizontal tail plane 9.4 sq. ft.
Area of elevators (7.45 each) 14.9 sq. ft.
Area of fin 5.7 sq. ft.
Area of rudder 7.3 sq. ft.
Dihedral (upper plane) 0.
Dihedral (lower plane) 1 in 20.

MAIN WEIGHTS

Weight of machine with water 1444 lbs.
Armament 86 lbs.
Pilot 152 lbs.

PERFORMANCE

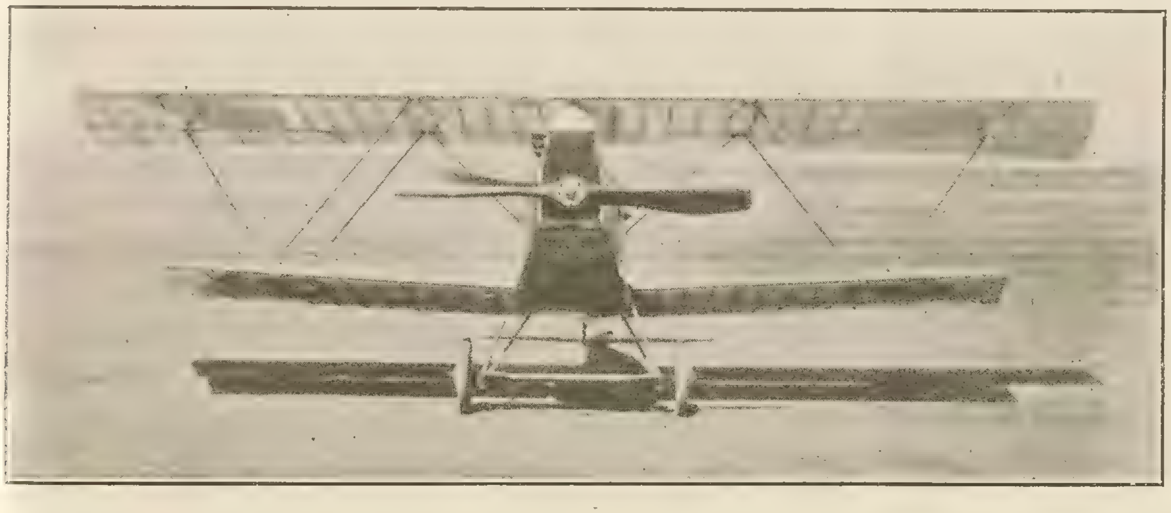
Altitude (ft.)	Time	Speed (m.p.h.)
Ground		
3280	2 min. 30 sec.	140.5
6561	5 min. 15 sec.	137
9842	8 min. 30 sec.	133
13123	13 min. 0 sec.	127.5
16404	18 min. 15 sec.	120

STRUCTURAL FEATURES

The triangular fuselage construction of the S.V.A. is very interesting. It consists of box longerons reinforced with hard wood strips. Cross bracing is attained by veneer bulk heads and the entire fuselage is covered with veneer excepting the motor section which is aluminum.

The tail surfaces are of steel tubing, welded. The tail skid is made up of three spring steel leaves.

The inter plane struts are streamline steel tubing and constitute a Warren truss, which reduces the complexity and resistance of the wing structure, though adding to the weight.



S. V. A., with 234 hp. S. P. A.

S. V. A., with 234 hp. S. P. A.

Over the Rockies in a Fokker

On Apr. 26, when the "Far West Liberty Loan Flying Circus" reached Helena, Mont., Major Carl Spatz, A. S. A., M. A. flew a German Fokker from Helena, Mont., to Great Falls, over the Big Belt Spur of the Rocky Mountains, to assist and augment a "side show" which had proceeded to Great Falls by train under the command of Major Robert Walsh. Major Spatz has given a brief account of the trip:

"Before leaving the ground I provided myself with a map of the country between Helena and Great Falls. Although not very suitable for cross country flying, it showed the Missouri River and most of the mountains.

"I left Helena, Mont., at 11:15 a. m. The field at Helena was the drill ground at Harrison Barracks about 4½ miles northwest of the city. It was rather small for the altitude above sea-level, 4,700 ft. The length into the wind was 350 yds.

"After taking off I headed directly toward a notched mountain peak This peak I had been informed was one of the sides of a canon through which the Missouri river flowed, and was a little west of north from the take-off field. For the first 15 minutes the country was fairly smooth and a landing could be effected anywhere. The Missouri River was visible after attaining an altitude of about 1,500 ft. After 15 minutes flying I reached the mountains which border the northwest portion of the valley in which Helena is situated. My altitude at this time was 5,000 ft. above the take-off field. For the next ten minutes the country beneath was very rough. A strong north wind prevented any remarkable progress. After 25 minutes I was directly over the Missouri River and at 7,000 ft. altitude above the field at Helena. The river, being dammed, forms a lake some 20 to 30 miles long. For the next 15 minutes I followed north along this lake. The mountains rise abruptly from both sides of the lake. A landing could have been made, if necessary, in the lake. Continuing north along the river the mountains receded from the western shore and excellent landing places were apparent. Reaching mid-canon at the end of these 15 minutes, I seemed to stand motionless in the air as far as any progress over the ground was concerned. At mid-canon the Missouri has cut a narrow gap through the mountain ranges. I estimated their height to be about 10,000 ft. above sea-level.

"My altitude upon reaching Mid-Canon was 8,000 ft. above the level of Helena. The mountains appeared to be about 3,000 ft. above. Reaching Mid-Canon and feeling that the wind was preventing much progress I nosed down slightly, passing through the canon into the level country beyond. My altitude after this manoeuvre was 3,000 ft. above Helena. Level country was between this point and Great Falls. Better progress was made from this point and I reached Great Falls at 12:30 p. m.

"The landing field was very narrow into the wind direction. In order to land I was forced to clear one line of telegraph wires and glide under another. Reaching the ground safely and having stopped rolling I attempted to taxy the machine. Striking a ditch resulted in breaking the tail skid and damaging the rudder.

"The trip took one hour and fifteen minutes. The distance following the river is about 100 miles. No rough air or unusual wind currents were experienced while over the mountains, although at times the tops seemed fairly close to the landing chassis. However immediately upon reaching the level country between Mid-Canon and Great Falls the air became exceedingly rough and continued so all the way to Great Falls. During the trip there was only about one 15 mile stretch where there was no landing place available."

Testing a Helium Balloon

First Lieut. Robert S. Olmstead, Air Service, Aeronautics, was ordered from Washington, to Fort Monroe, recently, for the purpose of testing a Helium balloon, and Sextant Instrument for measuring horizontal angles.

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Formerly Air Service Journal

America First!

OUR Navy has brought to the United States great honor by winning the premier prize in all aeronautic achievement. Sound engineering and co-operation made the flight possible. Daring and expert piloting by Commander Albert Cushing Read put the NC-4 in Lisbon, and his name has been added to the roster of discoverers which the Atlantic has given the world. The success is all American. The 'plane is a native product both as to type, design, construction and development. The four Liberty engines have added the last word to their fame.

What next? Will the North Pole be viewed from aloft? The Pacific has its triumphs in store for the next generation of aviators. The continents are being put under the wings of increasingly reliable machines. The trip around the world, which has been the goal of centuries for all forms of locomotion, is the ultimate in aviation.

Duration, distance, altitude and speed will continue to be the minor tests of aeronautical development, but when these are made over the earth's main surfaces, they will become the lure of the venturesome, the triumph of the constructor and the fame-gatherer will be the pilot

Hawker and Grieve

IF the popular enthusiasm which has shown itself over the rescue of Hawker and Grieve after their brave attempt to win the greatest laurel in aviation, is indicative of the world's appreciation of the heroes of the air, an incentive to future achievements beyond compare has been put in the heart of all fliers. The unknown has always been the field of adventure that has stirred the highest emotions. The staking of life on the chance success has invariably brought its reward of honor. Coupling with this the striving for a triumph which would bring glory to the nation, has made the trans-Atlantic flight a goal of paramount endeavor.

Hawker and Grieve have won everlasting fame by their attempt. They are a credit to the profession which has always disregarded personal safety when progress was to be made. The aeronautical devotees of the United States give homage to these intrepid and daring pioneers.

Stagger in the Biplane

ONE of the most difficult questions which a designer has to settle in the preliminary stages of a biplane design is whether he shall have a staggered or an orthogonal biplane. In the staggered biplane the upper plane is moved ahead of the lower plane; in the orthogonal biplane, the upper plane is directly over the lower plane.

Stagger is sometimes used as a device for securing balance. If the plane is nose heavy the upper plane may be staggered forward moving with it the center of pressure. It is scarcely this, however, that rules the design, since correct balance may be secured in other ways. The question of using stagger really depends on three factors —the aerodynamical efficiency, the stresses, and the vision.

In the wind-tunnel the staggered combination is more efficient than the orthogonal biplane, as it is evident it should be. It gives more lift, and more lift-drift ratio. But when the stresses are worked out, it is invariably found that the stagger causes a large component of the lift load to be carried along the chord, in the drift truss. This means more compression in the spars and a heavier internal drift truss, so much so that the aerodynamical advantage of the stagger is more than offset, particularly if the stagger is very large.

It would seem therefore a fallacy to employ large stagger and better to keep to the orthogonal biplane. Yet the tendency, particularly noticeable in the latest fast German machines, appears to be to use large stagger with a deep body, and small gap.

Apparently there is a sacrifice of weight and efficiency. The answer is that everything in a military machine is dependent on vision. With the large stagger and small gap the pilot has a practically uninterrupted view above, and good vision for landing.

This is another of those curious and numerous instances of compromise and sacrifice in design which makes the art so peculiarly fascinating to its devotees.

Time for Congress to Act

CONGRESS is again in session and the important question of an independent Air Service will be one of the matters that will receive wide discussion. The Secretary of War has decided to lay before the Military Affairs Committee his Air Service projects; the main divisions of which concern the organization, equipment and technical development of this branch of the War Department.

The ordering of service planes so urgently needed by the Air Service and which have been requested by the various sections has been held up pending conferences at the capitol. It is again becoming apparent that if this country is to have an adequate Air Service equipment that Congress must speak.

Another development that has been held up is the purchase of the Dayton-Wright plant for the Technical Section now at McCook Field. It is to be hoped that this plan will be viewed from every angle before it is consummated, as it will have a vital effect on the future of this important experimental work.

Congress has given indications of being willing to develop an adequate Air Service. Now is the time to put these intentions into effect.

Success of the Navy Planes

THE success of the NC-4 in crossing the Atlantic to the Azores and the flights of the NC-1 and NC-3 have caused much gratifying comment on the work of the Bureau of Construction and Repair of the Navy of which Admiral Taylor is the chief. It has demonstrated that the NC class of seaplanes are not only airworthy but seaworthy.

The flight to date has been worth all it has cost by showing that in case of an emergency seaplanes can be convoyed over long sea areas. The weaknesses that have been developed will serve to bring about improvements in future ships. The popular interest will give the Secretary of the Navy a great backing in Congress when the future plans of the Navy are under consideration.

News of the Army and Navy Air Services

Distinguished Service Medal

By direction of the President, under the provisions of the Act of Congress approved July 9, 1918, the Distinguished Service Medal is awarded to the following named officers and civilians:

Col. C. C. Culver, U. S. Army, for exceptionally meritorious and conspicuous service. To Colonel Culver's untiring energy, close application and perseverance is due the credit for having completed the co-ordination of the chain of events leading from the earliest conception of the Radio Telephone to the successful accomplishment of Voice-Commanded Flying carried through to full fruition.

Nugent H. Slaughter, formerly Lieutenant-Colonel, U. S. Army, for exceptionally meritorious and conspicuous service in the very successful development of the radio equipment of the United States Army.

Elbert J. Hall, formerly Lieutenant-Colonel, Signal Corps, U. S. Army, for exceptionally meritorious and conspicuous service rendered in the designing of the Liberty engine, and subsequently in the adapting of the Le Rhone engine to the American methods of production, and also in pushing to completion the American adaptation of the De Haviland plane.

Brice P. Disque, formerly Brigadier-General, U. S. Army, for exceptionally meritorious and distinguished services rendered in connection with the organization and administration of the Spruce Production activities of the Bureau of Aircraft Production while serving as officer in charge of the Spruce Production Division and President of the United States Spruce Production Corporation.

Lieut. Col. E. V. Sumner, U. S. A. For exceptionally meritorious and distinguished services. As commanding officer of the Air Service Production and Assembly Center at Romorantin, he displayed peculiar administrative ability in coordinating the work of the many different elements at the largest Air Service project in the A. E. F. The satisfactory results obtained at Romorantin were due largely to his tireless energy and skill in supervising and directing its operation. His example established a spirit of team work and accomplishment which were most marked.

Col. Walter G. Kilner, U. S. A. For exceptionally meritorious and distinguished services. By his personal efforts and efficient labors he organized the machinery necessary to train pilots, and successfully developed this branch of the Air Service. He overcame numerous difficulties inherent in the establishment of such an organization in a foreign country, and it was largely due to his efficiency that the Air Service was able to furnish well-trained personnel to the squadrons at the front. He at all times displayed marked devotion to duty, untiring energy and sound judgment.

Col. Halsey Dunwoody, U. S. A. For exceptionally meritorious and distinguished services. As Chief of Supply and Assistant Chief of Air Service, by his energy, tact and executive ability he built up an efficient supply service, capable of meeting the program for material, airplanes, motors and equipment. He established and maintained excellent relations with the Allied Military Authorities. His service was marked by exceptional administrative ability, comprehensive knowledge of the needs and conditions of the service, and whole-hearted devotion to his important tasks.

Change in Insignia of Aircraft

In accordance with an agreement between the Secretary of War and the Secretary of the Navy to change the distinguishing insignia on aircraft and pursuant to the instructions contained in Second Idorsement, A. G. O., April 30, 1919 (400,161 Misc. Div.), addressed to the Director of Air Service, the following regulations are published for the information and guidance of all concerned:

The design shall be a red circle inside of a white, five-pointed star, inside of a blue circumscribed circle. The circumference of the inner circle shall be tangent to the lines forming a pentagon made by connecting the inner points of the star. The inner circle shall be red, that portion of the star not covered by the inner circle shall be white, and that portion of the circumscribed circle not covered by either the inner circle or star shall be blue; the colors to be the same shades as those in the American Flag.

These insignia shall be placed on the upper and lower surfaces, respectively, of the upper and lower planes of each wing in such position that the circumference of the circumscribed circle shall be tangent to the outer tips of the planes. One point of each star shall be pointed directly forward, and unless otherwise specified the diameter of the insignia shall be 60 inches.

The insignia for the rudder shall be three equally wide bands, red, white, and blue, and both sides of that portion of the rudder which are in the rear of the rudder post shall be striped parallel to the vertical axis of the airplane. The blue band shall be nearest the rudder post, the white band in the center, and the red band at the tail of the rudder; the colors to be the same as herein-before-mentioned.

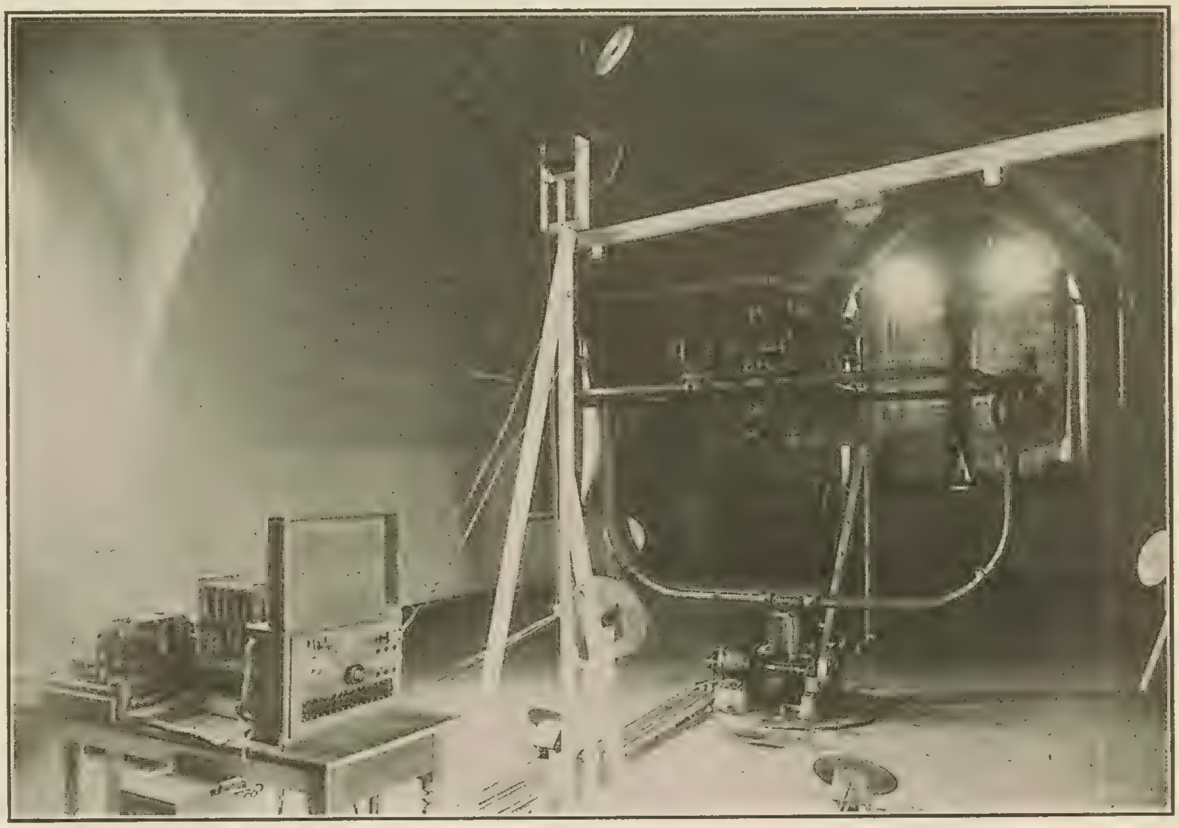
The insignia may be painted on or applied by decalcomania transfer.

All aircraft now built will continue to have the "3-circle" insignia for the present, but all aircraft delivered after the date of the issuance of this order, except those that have the "3-circle" insignia already painted on wing sections, or in the case of lighter-than-air aircraft, on fabric panels, will have the "star" insignia.

This change will be generally effective for all aircraft not later than January 1, 1920, except that under no circumstances will the "star" insignia be used on aircraft in European countries until after peace is declared.

Sphereograph Devices

Under direction of Prof. Lane Eno of Princeton College, and O. V. Fry of the Psychological Department of Princeton University, has designed and developed a device known as a Sphereograph in the operation of which on the ground a person experiences all the movements of an aviator in flying. In fact, with his eyes closed it would be impossible to detect whether he was in the air or on the ground. This remarkable device is intended for the training of aviators, with special stress laid on aerial gunnery.



The Eno-Fry Sphereograph

It is so arranged as to develop the actual movements of a plane in the air, with the exceptions of the movement of translation. By means of controls similar to controls of a plane, the prospective combat-flier aims his gun by moving his entire machine. When a target or objective is presented to him by the man in charge of the test, he pulls his trigger, and a recording apparatus records the location of the moving trigger, the way the flier manipulated his machine and the exact location of his sights at the moment his trigger was pulled. This enables the officer in charge to determine just what defects in marksmanship are shown and just what the flier will have to do to remedy those defects.

Insomuch as it is possible to tell the location of the machine at any given moment, as well as the rate of speed of either of the planes, the apparatus lends itself to very careful tests and the activities that go to make up the mental and physical work of an aviator.

Altitude Record for Kelly Field

On Friday, April 25, 2nd Lieut. James M. Field, Jr., broke the altitude record for Kelly Field of 19,000 feet recently established by Lieut. W. R. Sweeley, by reaching a height of 20,100 feet in a De Haviland 4, equipped with a Liberty 12.

The total time required to make the flight was 74 minutes, with an average climb of 358 feet plus per minute.

Description of the Radio on the NC Seaplanes

Weighs Only 200 Pounds and Makes Possible Constant Communication Between Members of the Crews

The radio on the NC seaplanes, furnished by the International Radio Telegraph Co., 326 Broadway, New York, involves two transmitters. One is a ½ kw. spark transmitter, the main element of which is a streamline generator and accessory apparatus, which is given by an air propeller and is mounted on the deck of the boat aft. This set weighs only 45 lb., but is used for the regular telegraph communication between the seaplanes and stations up to a distance of 250 nautical miles. Since this set is driven by a propeller, it can only be used while seaplanes are in flight. The antenna used for this set is a single trailing wire leading from the tail of the boat for a distance of 250 ft. down and to the rear. A streamline lead weight holds the lower end of this wire down.

With this transmitter it is possible for the commanding officer to send messages from time to time regarding the progress of the flight, to be retransmitted by the nearest shore station to the Navy Department. Also communication can be held with destroyers or other craft and radio compass signals or other information requested.

The other transmitter is a combined telephone and telegraph transmitter, and operates on a small 12-volt storage battery. It is used on an antenna consisting of wires permanently stretched on the skid fins on the upper planes so that it may be used while the seaplane is in flight or on the water.

It is this set which is used for telephoning between the planes, arrangement being made so that either the radio operators or the commanding officers themselves may communicate directly by telephone while the planes are in flight. Such interplane telephoning may be carried on up to a distance of twenty miles. While on the water this set may be used for telegraphing or telephoning a distance of about thirty miles.

A special feature of the telephone sets is the anti-noise microphone, which is so constructed that the engine noises are not heard. This is accomplished by having the back of the microphone open. The exterior sound waves strike the back as hard as the face of the diaphragm, and therefore the effect is neutral. The voice waves strike only the face of the diaphragm, and even though the operator cannot hear his own voice, the radio sets receive enough effect to modulate the transmitted wave.

This single item has been the deciding factor in success or failure in long distance transmission by telephone by airplanes. It is easy enough for short distances to get communication with an ordinary microphone, but for long ranges it is impossible without the anti-noise transmitter.

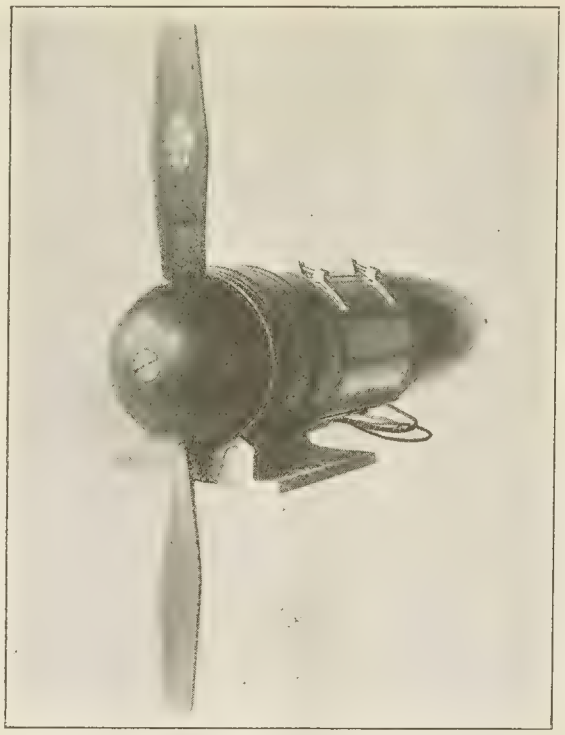
One of the most important of the radio installations on these seaplanes is the radio compass. This consists of a set of revolving coils mounted in the tail of the machine, on which are mounted many turns of enameled copper wire. The radio waves are picked up on these coils by revolving the coils until the radio signals obtained on two methods of connection are of the same strength.

The operator then knows the direction of the incoming waves. By then reading the position of a pointer on a scale on the coils, the bearing of the transmitting radio station is determined. This bearing is then communicated by the radio operator to the navigating officer by means of the intercommunicating telephone, which consists of telephone receivers built into the helmets, and the same type of microphone used by the operator.

Using the same inter-communicating telephone system, the navigator can telephone to the pilots, giving them the proper direction in which to steer the plane. He may inquire of the engine room regarding the condition of the engines, or he may hold radio telephone conversation with the navigating officer on one of the other planes.

In other words, the inter-communicating telephone makes possible constant communication between all members of the crews in spite of the terrific noise caused by the engine and the wind rush, and in spite of the fact that they are located in separate parts of the seaplane. In addition to this the radio telephone makes it possible for the commanding officer and navigators to talk directly with each other, although their seaplanes may be flying at a distance of 20 miles apart.

The radio compass signals may be received from a destroyer at a distance of 75 miles, or from large land stations at a distance of 600 miles.



Radio set on the NC boats

The regular receiving apparatus on the seaplanes will permit of reception from land stations of high power at distances of several thousand miles.

The main striking fact regarding this radio equipment is that, completely installed, it weighs only 200 pounds.

Propellers in a Hurry

The three Navy planes began their journey from Rockaway to Trepassey bay equipped with special propellers, which differ radically from all other types used in water or air, and during the flight to Trepassey bay these propellers had broken down under the heavy strain and had to be replaced with others at a moment's notice. This was on Friday, May 9, and the Navy Department in Washington was instantly notified of the predicament.

In Baltimore at the American Propeller Company's works on the afternoon of May 10 everything was quiet, the force getting ready to quit and enjoy the holiday, when Washington rang in on long distance and a dozen propellers for the great flight were demanded in the shortest possible time. Lieut. George S. Murray of the Bureau of Steam Navigation, U. S. N., which had the matter in charge, was already on his way to Baltimore with drawings and specifications. The whole force of the American Propeller Company was assembled and work began at 7 P. M., and through that night and Sunday was continued without break. At 7 P. M. Sunday the 12 propellers were made and varnished. A day was required for the varnish to dry and on Monday night in a special baggage car, with Lieutenant Murray beside them, the propellers started for Boston; on arrival there early Monday morning by special trucks they were taken to the fast torpedo-boat destroyer Edwards, waiting with steam up; the hatches were found too small to take the propellers below and they were lashed on deck and the boat under forced draft started for Trepassey Bay.

These Baltimore-made propellers were delivered at this far-off Newfoundland point on the afternoon of Wednesday, May 14, four days from the time of their being ordered.

The propellers were of the ordinary two-blade type, 10 ft. in diameter, and were for the three tractor engines of each plane to pull a gross load of 28,000 pounds at an expected speed of 85 miles an hour.

The American Propeller Company feels well satisfied that it was able to come to the scratch at the critical moment, and the Navy Department has been lavish in its praise of the achievement of this Baltimore firm.

Big Deal By Curtiss

A deal by which the Curtiss Aeroplane and Motor Corporation repurchases from the Government 2,176 airplanes and 4,608 motors made by it during the war was announced May 24 by W. W. Mountain, vice-president and general manager of the company.

This deal had been reported at various times as about to be consummated, but had always fallen through each time before. The contract was signed for the War Department by Major-Gen. Charles T. Menoher, head of the air service, and by C. M. Keys, a vice-president of the Curtiss concern.

The price was not announced by Mr. Mountain, but it is known that in previous negotiations the Curtiss company refused to buy the planes and motors for $2,720,000 unless the Government agreed not to dispose of other Curtiss planes or motors to private purchasers for two years.

Included in the deal are 1,100 Standard airplanes which the Curtiss Corporation did not build, but which they are buying in order to get back the Curtiss motors with which they are equipped.

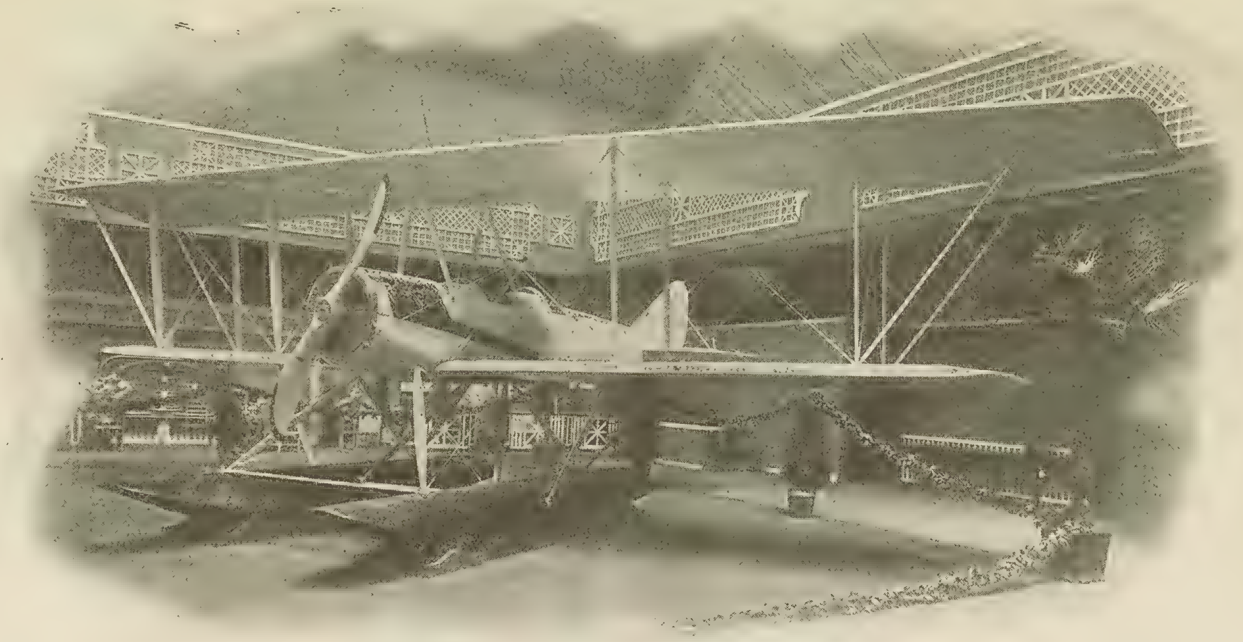
"The machines and motors were examined and inventoried at the thirty-two fields maintained by the Government by representatives from the War Department and the Curtiss corporation, who made a complete record and report of the number of new machines and the exact condition of those which had been used," the statement issued by the Curtiss company says.

The Curtiss company will concentrate the purchased planes and motors at five fields, where it will maintain a staff of mechanics to inspect every plane before delivery to customers. All planes and motors needing overhauling will be sent to the plant in Buffalo.

The deal involves the largest single purchase of airplane material ever made by a private corporation and is in line with the policy adopted by the Government to encourage the airplane industry and also to take every precaution against accident through unorganized distribution. The negotiations for this purchase have been under way for several months. The Curtiss corporation did not desire to undertake the redistribution of these machines and motors except as a means of stabilizing the industry and protecting their good name with purchasers. The price paid was made by the Government.

Aerial Mapping of the U. S.

It is reported that the progress in the aerial mapping of the United States has advanced beyond all expectations, and it is quite probable, due to the numerous flights that are made on which observations are taken, that the entire country will be aerially charted before the close of the present year.



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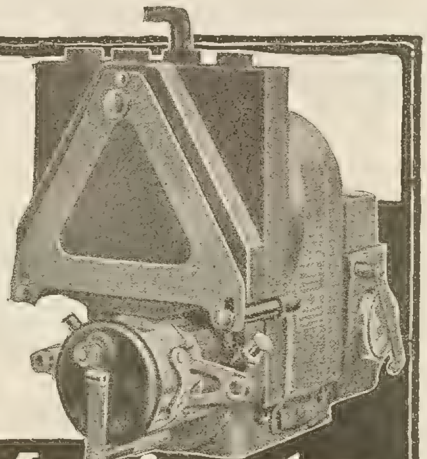

Berling Magneto
WORTH MORE DOES MORE

America First to Fly the Atlantic

(*Continued from page* 3)

done in way of perfecting navigating instruments, as well as many details of airplane design, but I confidently believe we can look forward to frequent trans-Atlantic flights in the near future, and when I say this I mean trans-Atlantic flights regardless of weather conditions.

J. G. Vincent.

Dayton, O., May 27, 1919.

Howard E. Coffin

Member National Council of Defense and the American Air Commission now on the way to Europe

The accomplishment of the trans-Atlantic flight means great things to civilization, of course; but to persons familiar with aviation matters it was a foregone conclusion that it would be made successfully if attempted under anything like favorable weather conditions.

So far as my information goes the principal difficulty encountered by the Navy seaplane was fog, which is an element nearly as dangerous to ships as it is to flying boats. Even land transportation has its perils in foggy weather. There seemed to be little or no trouble with the engines or with the planes themselves, and this is a point not to be overlooked.

Psychologically the effect will be of tremendous importance. The layman looks only at the spectacular features of aeronautics, and upon him these developments make a great impression, inspiring general confidence in air transportation, and its future in America.

Col. E. Lester Jones, A. S.

Supt. U. S. Coast and Geodetic Survey

Replying to your wire as to what I think the accomplishment of the trans-Atlantic flight means to civilization:

The successful flight of the NC boat from Newfoundland to the Azores was a wonderful achievement. Transportation by land and water has been a potent factor in bringing people together and in spreading civilization. The Atlantic flight makes a tremendous step in transportation and the confidence resulting will surely be far reaching. I look for the airplane to make a non-stop flight before long.

E. Lester Jones, Superintendent U. S. Coast and Geodetic Survey.

Washington, May 27, 1919.

Civilian Flying Licenses

The following civilian flying licenses have been issued by Joint Army and Navy Board of Aeronautic Cognizance:

Issued to	Address
William Diehl, Jr.	New York City
James Daniel Howard	Brookline, Mass.
Martin F. Metzler	Philadelphia, Pa.
George W. Blakeley	Boston, Mass.
Ralph N. Largent	Nampa, Idaho
Bertram B. Tate	Summerfield, Alabama
Frank M. Bradbury	Richmond, Va.
Howard E. Murchie	West Orange, N. J.
George H. Wirth	Houston, Texas
Charles E. Hastings, Jr.	Wilmette, Ill
Ernest C. Sly	Fairhope, Ala
John K. LaGrone	Smith Center, Kansas
Philip J. Morey	Kerrville, Tenn.
Bertrand B. Acosta	San Diego, Cal.
E. Clifford Barber	Jonesville, Michigan
Thomas Henry Baskin, Jr	Chicago, Ill.
Oscar A. Solbrig	Davenport, Iowa
Charles A. Vander Veer	Atlantic City, N. J.
C. C. Baldwin	Chicago, Ill
Pierce Raney	St. Louis, Mo.
N. R. Lovern	Charles City, Iowa
Edward Axborg	Dallas, Texas
Charles Carlisle Penfield	New York City
Theodore L. Tibbs	New York City
George Andrew Wilson	New York City
Daniel Kiser	Chicago, Ill.
Horace C. Burnham	Oldtown, Maine
C. E. Jones	Chicago, Ill

Howard C. Brown, Charleston, W. Va.
Robert John Wilde, Baltimore, Md.
James Hodgens Smith, Overland Park, Kan.
B. M. Spencer Vallejo, Cal.
Gilbert G. Budwig, Washington, D. C.
Wm. A. Kopseker and Wm. C. Miller, Topeka, Kan.
H. R. Cruikshank, Chicago, Ill.
Fred DeKor, Kansas City, Mo.
Monte Rolfe, Elizabeth, N. J.
Edward A. Terhune, Jr., Dorchester, Mass.
Raymond B. Quick, Weehawken, N. J.
Thomas Hayes Potter, Boston, Mass.
Louis Henry Mueller, San Francisco, Cal.
Crescent Balloon Company, West Haven, Conn.
L. G. Haugen, Northwood, Iowa.
Wm. Burleigh Hutchinson, Dayton, Wash.
George T. Wright, East Lansing, Mich.
Harry M. Jones, Cambridge, Mass.
W. H. Cushing, Philadelphia, Pa.
Police Reserve Air Service of the City of New York, New York City.
Wayne V. Pittman, Montgomery, Ala.
H. Lorimer Rhoades, Forest Hills, Long Island, N. Y.
Harry Gray Carley, W. Newton, Mass.
Horace B. Wild, Lincoln, Nebr.
Errold G. Bahl, Humboldt, Nebr.
John L. Salway, Ridgewood, N. J.
Henry Irvin Beall, Camp Morrison, Va.
Stanley Clarke, Winchester, Mass.
William D. Davis, New York City.
Overton M. Bounds, Elizabeth, N. J.
Charles A. Skiver, Indianapolis, Ind.
Paul Robert Blair, Chicago, Ill.
Asheville Aerial Corporation, Asheville, N. C.

Capt. Lyman C. Cotton, U. S. N., is announced as a new member of the Joint Army and Navy Board on Aeronautic Cognizance.

Lawson's Airline Co.

About three months ago the Lawson Air Line Transportation Company was organized under the laws of the State of Wisconsin for the purpose of building aircraft and operating a transportation line.

The company was then incorporated for $25,000 and all the stock subscribed for by a few of the leading business men of Milwaukee.

Alfred W. Lawson, who has been manager of the Lawson Aircraft Corporation of Green Bay, Wis., during the past three years, was made president and general manager of the Lawson Airplane Transportation Co.

The new company has progressed so rapidly in its work during the past three months that it now has almost completed a 20-passenger carrying heavier-than-air machine which it will use to demonstrate the possibilities of passenger carrying service between Milwaukee, Chicago and New York as soon as completed.

THE AEROMARINE PLANE AND MOTOR COMPANY

Will Specialize in Filling the Individual Requirements of

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Delivery of Planes and Engines

All orders for planes and engines have been completed except one order for Hispano-Suiza 300 horsepower service engines, which is forecast for early completion.

The number of planes and engines delivered before and since the date of the armistice, with the percentage distribution, is shown in the following table, prepared by Statistics Branch, General Staff, War Department:

Article	Before Armistice	Since Armistice	Total	Per Cent Delivered Before Armistice	After Armistice
Planes					
SJ-1, training	1600	0	1600	100	0
Penguin, training	300	0	300	100	0
S4B, training	100	0	100	100	0
Handley-Page, service	101	6	107	94	6
JN4-D, training	3746	346	4092	92	8
JNH, training	1690	274	1964	86	14
S4C, training	372	125	497	75	25
DH-4, service	3227	1615	4842	67	33
Le Pere, service	7	18	25	28	72
E-1, training	12	116	128	9	91
SE-5, training	5	52	57	9	91
Engines					
A7A, training	2250	0	2250	100	0
Lawrence 28 hp., training	450	1	451	100	0
Gnome 100 hp., training	278	2	280	99	1
OX-5, training	8318	1182	9500	88	12
Hispano 150 & 180 hp., tr.	3905	1170	5075	77	23
U. S. 12 Navy type, service	3645	1695	5340	68	32
U. S. 12 Army type, service	9929	5209	15138	66	34
Le Rhone 80 hp., training	1057	1443	2500	42	58
Bugatti, service	8	32	40	20	80
Hispano 300 hp., service	8	359	367	2	98
U. S. 8 Army type, service	0	15	15	0	100

Airplane for a Physician

In order to circumvent hardships caused by bad roads and irregular train schedules, Dr. Frank A. Brewster of Beaver City, Neb., has purchased an airplane in which he will make his professional calls this summer.

DR. FRANK A. BREWSTER

Dr. Brewster has the distinction of being the first physician in the world to own and operate an airplane in daily business use.

The airplane was purchased for him by Lieut. Wade Stevens, formerly of Air Service, from the Curtiss Aeroplane and Motor Corporation. It is the JN-4D-2 type which was used as a training plane by the United States and Canadian governments.

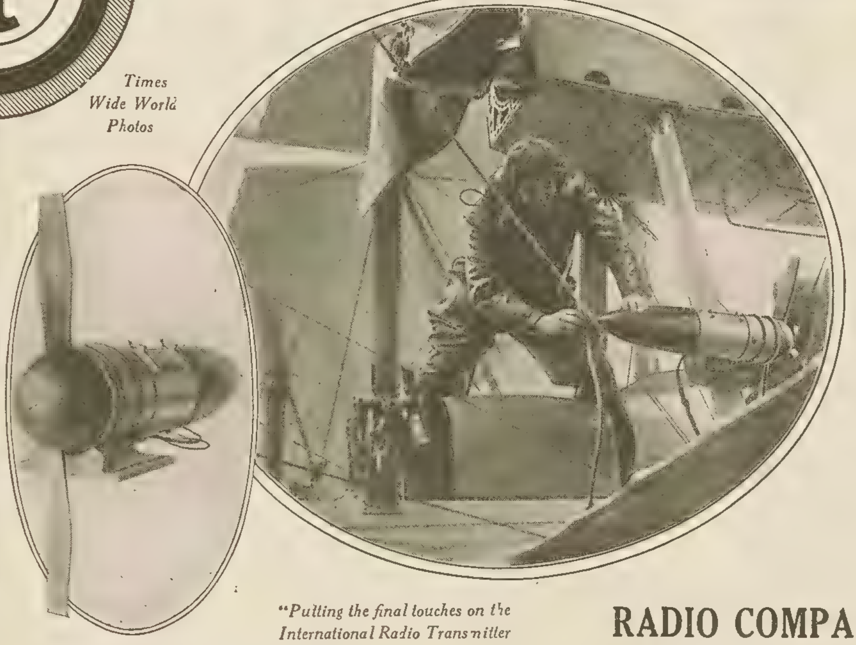
When Lieut. Stevens returned from the service, he was so optimistic over the future of air travel that he persuaded Dr. Brewster to purchase a plane. Lieut. Stevens will act as pilot and he will also teach Dr. Brewster how to fly.

Forest Patrol Airplanes

The use of aircraft enabling quick discovery of forest fires through an extended patrol system is rapidly coming forward. The greatest activities for the moment in the way of forest patrol experiments are in force in southern California through the united co-operation of the Commanding Officers of the United States Army Balloon School at Arcadia, California, and the United States Army flying school at March Field, Riverside, California.

There will be stationed an observation balloon at an elevation of about 3,000 ft. at the Balloon School Field near Arcadia. This observer will be on duty from 7 A. M. to 2:30 P. M. each day. He will be furnished with a map of the front of the Angeles National Forest from La Canada to San Dimas Canyon and can probably give adequate lookout service as far north as the crest of the San Gabriel watershed. The student detachment learning observation now stationed at Mt. Wilson will also render lookout service. Reports of fires from both the balloon observer and the Mt. Wilson detachment will come in by phone to the Balloon School at Arcadia and will be transmitted to the Forest Service at Los Angeles, who will call upon the appropriate unit of the suppression force.

In addition to lookout service there will be available at all times a 1½-ton truck at Arcadia equipped with a 50-gallon tank of water, shovels, canteens, axes and fire extinguishers. This truck, together with ten enlisted men, will become a unit of the suppression force subject to the call of the Forest Service.



Times Wide World Photos

International ½ K W Radio Transmitter

"Putting the final touches on the International Radio Transmitter on the N. C. 3"

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STANDARD EQUIPMENT ON
ALL N.C. TRANSATLANTIC
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WAR NEEDS FOR AIRCRAFT RADIO BROUGHT ABOUT ASTONISHING DEVELOPMENTS. THE INTERNATIONAL 500 WATT TRANSMITTER, WEIGHING ONLY 47 POUNDS, WAS HEARD OVER 1200 MILES DURING THE TRANSATLANTIC FLIGHT. WE HAVE SUPPLIED OVER TWO THOUSAND SIMILAR SETS, AND ARE BUILDING MORE.

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Hawker and Grieve Rescued in Mid-Ocean

(*Continued from page* 4)

"At this time we were flying well above the clouds at a height of about 15,000 ft.

"About five and one-half hours out, owing to the choking of the filter, the temperature of the water cooling out the engines started to rise, but after coming down several thousand feet we overcame this difficulty.

"Everything went well for a few hours, when once again the circulation system became choked and the temperature of the water rose to the boiling point. We, of course, realized that until the pipe was cleared we could not rise much higher without using a lot of motor power.

"When we were about ten and one-half hours on our way the circulation system was still giving trouble, and we realized we could not go on using up our motor power.

"We slept, or tried to most of the time, drank tea, and read the captain's English books. We saw St. Kilda, but it was not until the Butt of Lewis was reached that we could communicate.

"What we want to emphasize is that the fault was not due to the motor, which was in every way reliable, running satisfactorily from start to finish, even after boiling all the water away. The motor was still running merrily, though red hot, when we alighted in the water.

"Off Loch Eireholl we were met by the destroyer Woolston and conveyed to Scapa Flow, where we had a splendid welcome home from Admiral Freemantle and the men of the Grand Fleet."

Commander Mackenzie Grieve, the navigator of the Sopwith, said:

"When but a few hundred miles out a strong northerly gale drove us steadily out of our course. It was not always possible, owing to the pressure of the dense masses of cloud, to take our bearings, and I calculate that at the time we determined to cut across the shipping route we were about 200 miles off our course.

"Up to this change of direction we had covered about 1,000 miles of our journey to the Irish coast."

Thanksgiving Services

Provincial reports received in London show that the news of the rescue of Hawker and Grieve created everywhere joyous excitement. Special editions of the newspapers were literally snatched from the newsboys, and crowds gathered around the bulletin boards. The band of the Grenadier Guards at Northampton played "Rule Britannia," while thousands cheered.

The news was read from the lectern at Holy Trinity Parish Church, Hull, and the Bishop of Hull asked the congregation to sing "Praise God, From Whom All Blessings Flow," which they did with great heartiness.

Mrs. Hawker attended the evening service at her parish church, which took the form of a thanksgiving service. The vicar, the Rev. T. W. Wood, preached from the text, "For this, my son, is dead and is alive again. He was lost and is found." Not often, he said, had it happened in the history of this country that a single heroic act had fired the imagination and excited the admiration of men as had the adventurous flight of Hawker and Grieve. Englishmen, he said, had disputed with Columbus the honor of crossing the Atlantic for the first time, and strove to gain another leaf for England's laurel crown.

Roget's Record Flight

Lieutenant Roget, a French aviator, who left Paris early May 24 on the first leg of a projected trans-Atlantic flight by way of Dakar to Brazil, landed at 6 o'clock the same night at Kenitra, thirty kilometers from Rabat. His machine was damaged on landing, and the trans-Atlantic trip will have to be abandoned.

Lieutenant Roget seems to have beaten the record of the American Navy seaplane NC-4, which in its recent flight to the Azores covered 1950 kilometers (1211 miles), while Roget flew 2170 kilometers (about 1348 miles).

Answers to Correspondents

All bona fide inquiries will be answered by letter to the inquirer and included in these columns. Questions should be accompanied by stamped addressed envelopes.

H. M. D.—The characteristics of the Aerofoil U.S.A.16 are not as yet available for publication, although permission to give out this information may be obtained very shortly.

D. L. A: The nearest recruiting station to you is 311 Nicollet Avenue, Minneapolis, Minn. Write to Col. Charles W. Castle. The Air Service needs men with internal combustion engine experience.

L. K.—I would advise you to write to Materials Disposal Section, Director of Air Service, 4th St. and Missouri Ave., Washington, D. C. They have a great deal of material for disposal, and a motorcycle may be included.

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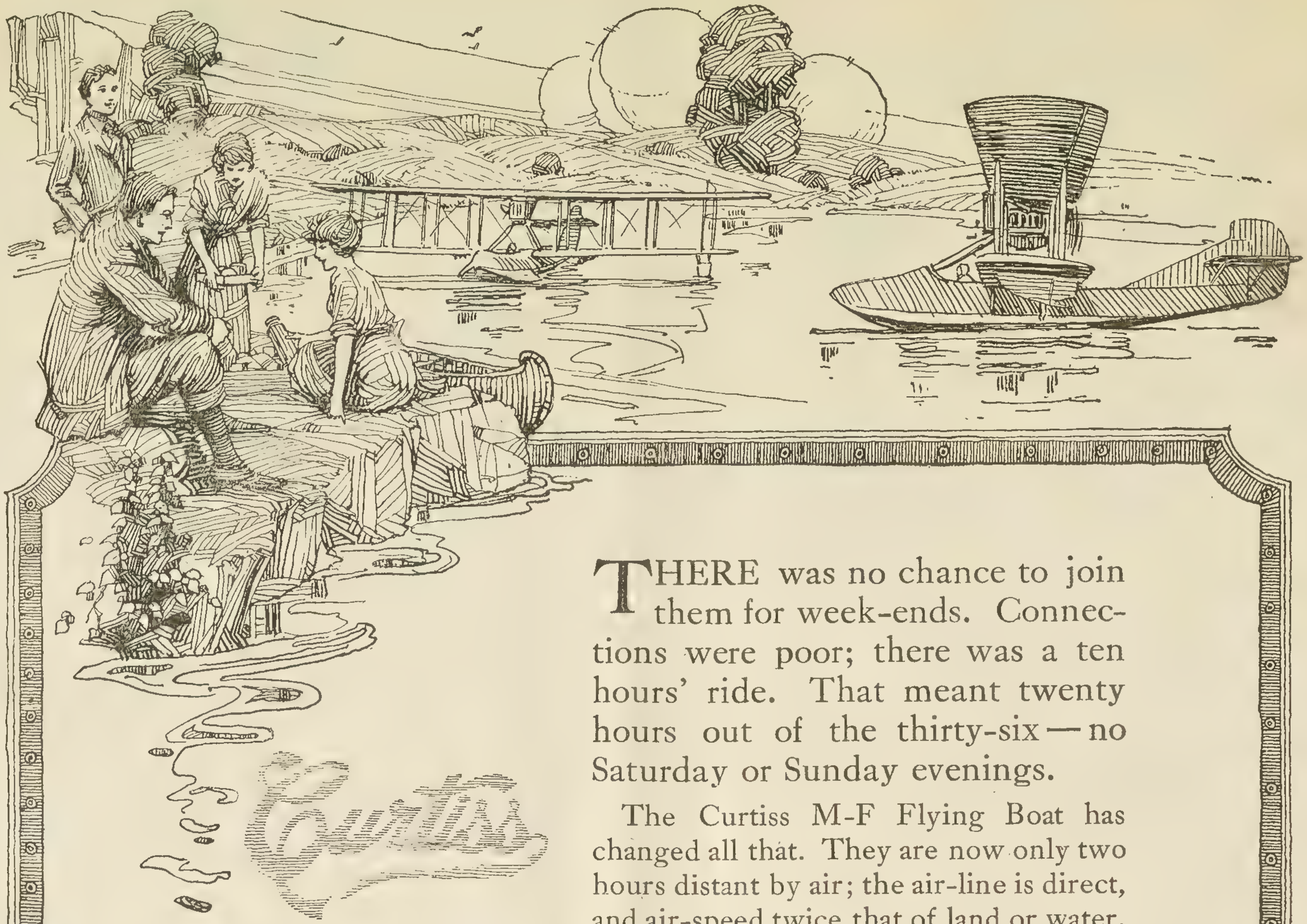

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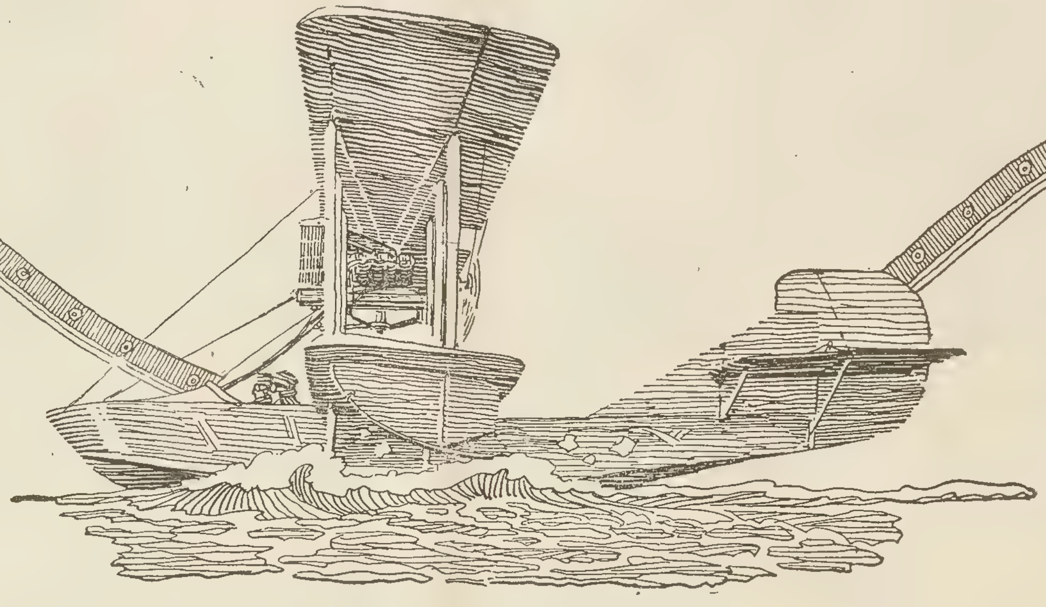

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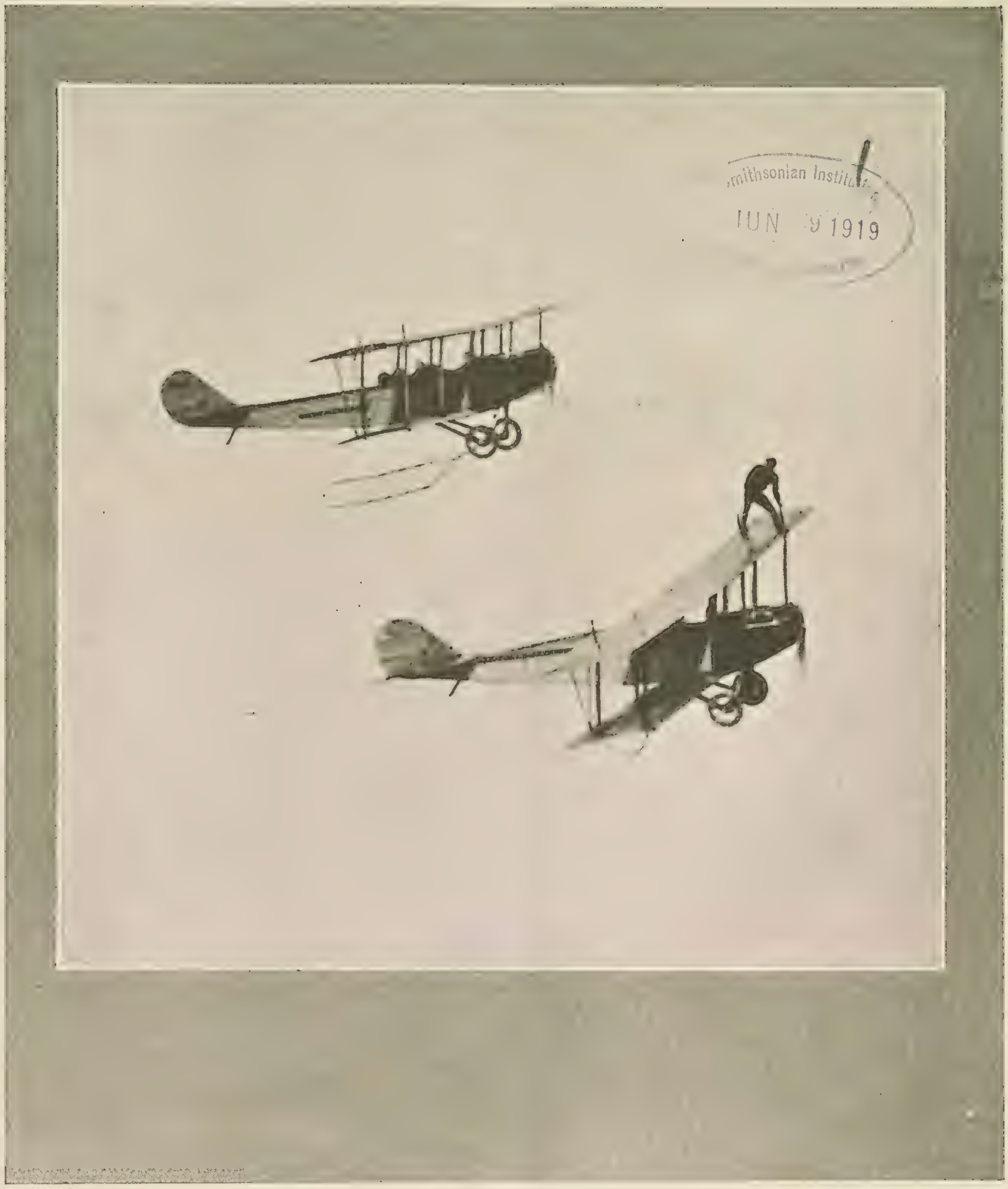

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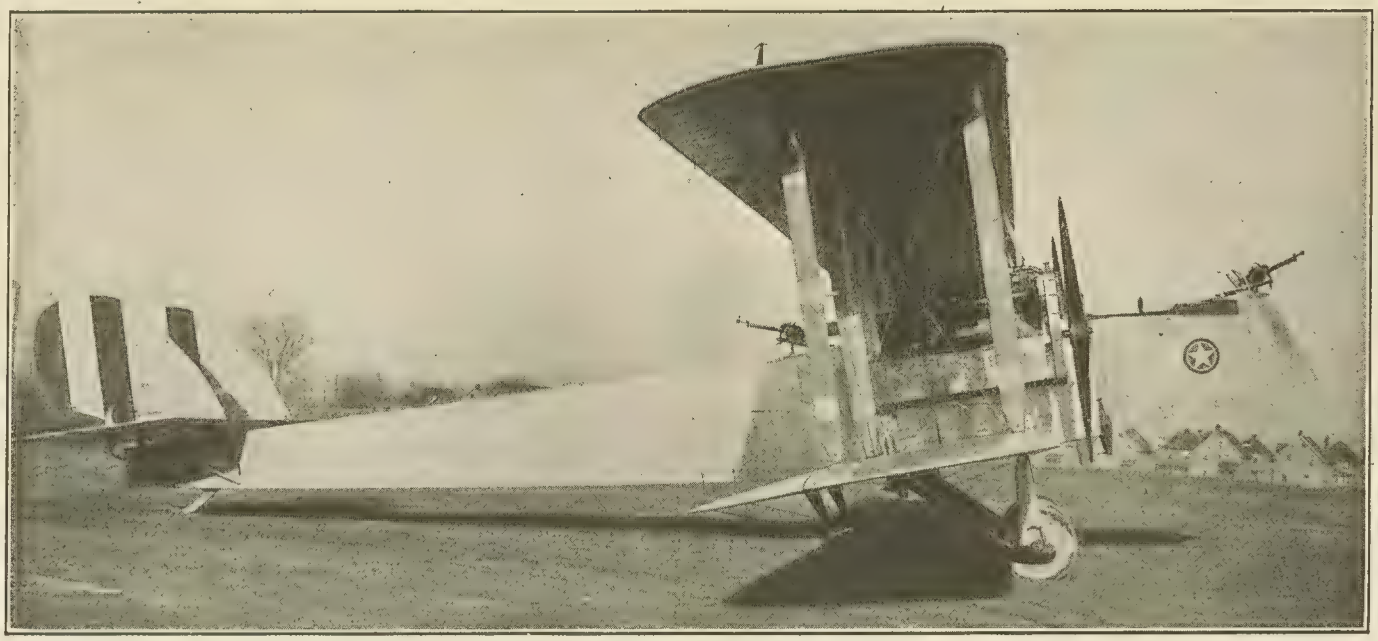
Lieut. Ormer Locklear's Daring Feat

Climbing from One Airplane to Another While They Are Flying 60 Miles an Hour



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The skill and ability of the HOUSE OF MARTIN continue to maintain Supremacy of Performance and Dependability which they have held since 1909.

MARTIN U.S.A.

THE GLENN L. MARTIN COMPANY
CLEVELAND

Contractors to the United States Government

NC Fliers Visit London and Paris

Summoned to the French Capital by the President; Then They Go Back to England

JUN 9 1919

The crews of the three American naval seaplanes were guests at a luncheon given by the American Naval Headquarters Staff in London, June 2.

Commander J. H. Towers, Lieut. Commander A. C. Read, who brought the NC-4 across from America, Lieut. Commander P. N. L. Bellinger, commander of the NC-1, and Lieut. D. H. McCullough, pilot of the NC-3, left London for Paris June 3, in response to a summons from President Wilson. They will return on Wednesday night, June 4, when the official British reception to the naval airmen will be held.

The Prince of Wales will attend this dinner at the House of Commons and Major-Gen. J. E. B. Seeley of the British Air Ministry will preside.

Arrival at Lisbon

At 2:38 P. M. May 28, the Navy Department received this dispatch from Commander Read:

"NC-4 left Ponta Delgada 10:18 G. M. T., May 27. Wind 200 degrees, 23 miles, visibility good. Sighted all destroyers except No. 3, which was missed on account of compass jarring out. Speed, first part, 88 knots. Run uneventful. Landed Lisbon 8:01 (civil mean time, 4:01 Washington time). Personnel and seaplane in excellent condition. Expect to leave for Plymouth morning of the 29th, weather permitting."

Off for Plymouth

Commander Read reported to the department June 1 on the flight of the NC-4 from Lisbon to Plymouth. The message, which was filed at 10:20 o'clock Saturday night follows:

NC-4 left Lisbon May 30, 5:29 (1:29 a. m. New York time). Weather normal, except rain squalls. Favoring wind. At 7:05 (3:05 a. m. New York time) leak discovered in port engine. Necessary to land for repairs. Landed Mendego River 7:21 (3:21 a. m. New York time) and repaired leak. Necessary to wait high tide about 2 in afternoon. Impracticable to make Plymouth same day. Left 1:38 (9:38 a. m. New York time) for Ferrol

(*Continued on next page*)

Story of the NC-4's Trans-Atlantic Flight

November, 1917—Navy authorities and Curtiss seaplane builders confer on plans.

January, 1918—A working model is tested and found satisfactory.

October, 1918—First NC boat makes trial flight at Rockaway.

February, 1919—Four planes are ordered by Secretary of the Navy to prepare for proposed transatlantic flight.

April, 1919—NC-3 and NC-4 are assembled at Rockaway.

May 7, 1919—NC-4 damaged by fire in hangar. Wings replaced and other repairs hurriedly made.

May 8—Left Rockaway 10:04 A. M. for Halifax, but forced down off Chatham, Mass., by motor trouble. Rode the sea all night and put in at Chatham Bay in morning.

May 14—Left Chatham for Halifax at 9:05 A. M., arriving 1:15 P. M., flying 340 miles in 4 hours 10 minutes.

May 15—Left Halifax for Trepassey at 9:52 A. M., but was compelled to land on the water thirty minutes later at Storey Head. Arose again at 11:47 and arrived at Trepassey at 5:37 P. M.—461 miles in 8 hours 45 minutes elapsed time, or 6 hours 20 minutes actual flying time.

May 16—Left Trepassey for Ponta Delgada, Azores, at 6:07 P. M. Arrived at Horta, Azores, at 9:25 A. M. May 17—1200 miles in 15 hours 18 minutes.

May 20—Left Horta for Ponta Delgada at 8:40 A. M., arriving 10:24 A. M.—150 miles in 1 hour 44 minutes.

May 27—After being held up a week by adverse weather, left Ponta Delgada for Lisbon at 6:18 A. M., arriving 4:01 P. M.—800 miles in 9 hours 43 minutes.

May 30—Left Lisbon for England at 1:24 A. M., but after flying 100 miles engine trouble caused a landing at the mouth of the Mondego River. Resumed flight at 9:38 A. M. and arrived at Ferrol, Spain, at 12:45 P. M.—330 miles in 11 hours 21 minutes elapsed time.

May 31—Left Ferrol, Spain, at 2:27 A. M.; arrived at Plymouth, England, 9:26 A. M.—475 miles in 6 hours 59 minutes.

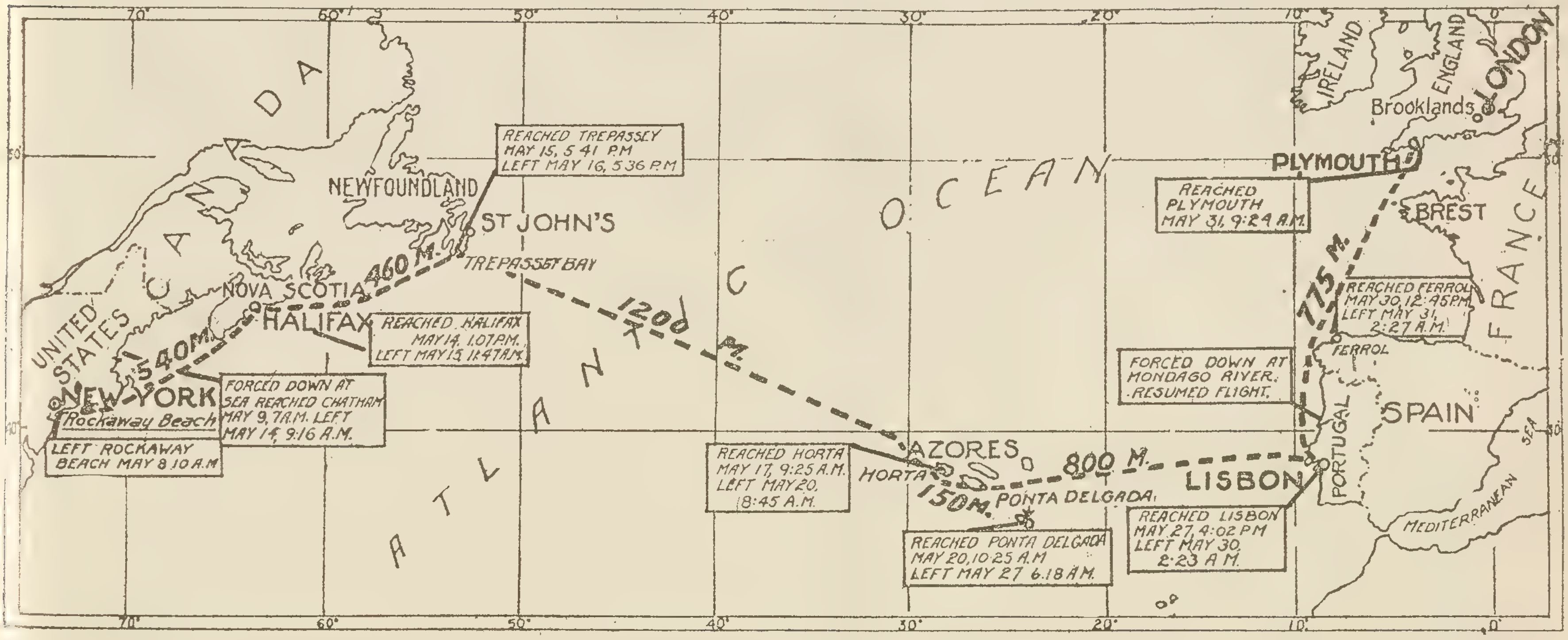
Note—All reckonings in New York time.

Record from Rockaway to Plymouth

The record of the NC-4 from Rockaway to Plymouth follows:

Date.	Course.	Start.	Arrived.	Air line in nautical miles.	Time in the air, H.M.	Knots per hour.
May 8	Rockaway to Chatham Light	10:04 A. M.	1:47 P. M.	190	3 43	51
May 14	Chatham to Halifax	9:05 A. M.	1:15 P. M.	340	4 10	85
May 15	Halifax to Trepassey	9:52 A. M.	5:37 P. M.	461	6 20	58
May 16-17	Trepassey to Horta	6:07 P. M.	9:25 A. M.	1200	15 18	81.7
May 20	Horta to Ponta Delgada	8:40 A. M.	10:24 A. M.	150	1 44	88
May 27	Ponta Delgada to Lisbon	6:18 A. M.	4:01 P. M.	800	9 43	81.3
May 30	Lisbon to Mondego River	1:24 A. M.	2:44 A. M.	100	1 20	75
May 30	Mondego River to Ferrol	9:38 A. M.	12:45 P. M.	200	3 7	64
May 31	Ferrol to Plymouth	2:27 A. M.	9:26 A. M.	475	7 6	66.6

Total air line distance 3916 nautical miles.
Time in the air from Rockaway to Plymouth 52 hours and 31 minutes.



70°
60°
50°
40°
30°
20°
10°
0°
CANADA
NEWFOUNDLAND
ST JOHN'S
TREPASSEY BAY
NOVA SCOTIA
HALIFAX
UNITED STATES
NEW YORK
Rockaway Beach
460 M.
540M.
1200 M.
800 M.
150M.
775 M.
REACHED TREPASSEY MAY 15, 5 41 P.M LEFT MAY 16, 5 36 P.M
REACHED HALIFAX MAY 14, 1.07 P.M. LEFT MAY 15 11.47 A.M.
FORCED DOWN AT SEA REACHED CHATHAM MAY 9, 7 A.M. LEFT MAY 14, 9:16 A.M.
LEFT ROCKAWAY BEACH MAY 8 10 A.M
ATLANTIC OCEAN
REACHED HORTA MAY 17, 9:25 A.M. LEFT MAY 20, 8:45 A.M.
AZORES
HORTA
PONTA DELGADA
REACHED PONTA DELGADA MAY 20, 10.25 A.M LEFT MAY 27 6.18 A.M.
LISBON
REACHED LISBON MAY 27, 4:02 PM LEFT MAY 30, 2:23 A M.
FORCED DOWN AT MONDAGO RIVER. RESUMED FLIGHT.
FERROL
REACHED FERROL MAY 30, 12:45 P.M. LEFT MAY 31, 2:27 A.M.
REACHED PLYMOUTH MAY 31, 9:24 A.M.
PLYMOUTH
BREST
IRELAND
ENGLAND
LONDON
Brooklands
FRANCE
SPAIN
PORTUGAL
MEDITERRANEAN SEA

Flight of NC-4 Across the Atlantic from New York to Plymouth

NC Fliers Visit Paris and London

(*Continued from preceding page*)

Harbor, Spain. Changes in course necessary, dodging rain squalls. Otherwise uneventful. Landed 4:47 (12:47 p. m. New York time). Two destroyers arrived to assist.

"Under way 6:27 next morning (2:27 a. m. New York time); sighted only two destroyers on account of squally and thick weather. Circled over Brest 11:05 (7:05 a. m. New York time); very thick in vicinity, frequent rain, head wind across channel. Sighted Plymouth nearly ahead at 1:12 p. m. (9:12 a. m. New York time) and landed 1:26 p. m. (9:26 a. m. New York time). Officially received by Mayor and Admiral Thursby. Personnel and seaplane in excellent condition. Three motors same as installed at Rockaway. Fourth installed at Trepassey."

Official Photo U. S. Naval Air Service.

CN-3 at Ponta Delgada, showing whaleboats under wing, serving in place of wrecked pontoons

A Perfect Landing

The seaplane when sighted off Plymouth, England, was flying high and leading an escort of three flying boats. Her enormous size, dwarfing that of the escorting planes, left no doubt of her identity. While the thousands of spectators yelled themselves hoarse, the flying boats dropped Very lights, and a fleet of small boats rushed up to greet the Americans.

The Captain's gig from the mine layer Aroostook proceeded to the NC-4 as the latter taxied up to her buoy, where she quickly made fast. It was a perfect landing. As her crew was being taken off by the boat from the Aroostook for the reception on the Rochester, the British flying boats swept into the Cattewater and drew up alongside the NC-4.

A strong west wind was blowing when the NC-4 came in. The inner harbor was calm, however, and presented a fine setting for the brilliant picture as viewed from the densely crowded slopes of Plymouth's celebrated playground, The Hoe.

Navy Congratulations

The American naval base received seventy telegrams, directed to the commander of the NC-4, Lieut. Commander A. C. Read, and others of the crew, congratulating them on the finish of the flight. The majority of the messages were from the United States, one being from Josephus Daniels, Secretary of the Navy, and another from President Wilson.

Before alighting in the Sound, the NC-4 circled The Hoe and passed over the spot from which the Mayflower sailed.

After a brief reception aboard the Rochester, Commander Read and his crew were taken to the Aroostook, where they doffed their flying clothes before proceeding to Mayor J. P. Brown's reception at the Mayflower Stone.

The parade leading to the pier was lined with British bluejackets from men-of-war and shore stations. Behind the line of bluejackets was an immense gathering of townspeople. On the gaily decorated pier a bluejacket guard of honor was drawn up under a canopy of Allied flags. The Royal Garrison Artillery Band played American and British anthems.

Mayor Brown arrived in state, accompanied by three mace bearers. He wore a cocked hat and crimson robe lined with fur, and the heavy gold Mayoralty chain. With him also were the Deputy Mayor, in gorgeous purple robe, and the bewigged Town Clerk.

Great Reception Where Pilgrims Sailed

British and American officers stood with the Mayor to receive the NC-4's crew. As their boat drew alongside the pier, the band played "The Star-Spangled Banner" and "God Save the King," and the crew then advanced to meet the Mayor.

In his address Mayor Brown said:

"Plymouth is always a point of historic interest to Americans. The memorable sailing of the Pilgrim Fathers from this spot, though comparatively unnoticed at the time, was an event which has proved to be a point in history of immeasurable interest. Mainly out of that small beginning, a mighty people has sprung up, and to-day, in most dramatic fashion, their descendants have crossed back to us in a way never dreamed of by our forefathers, and equalling in scientific development and daring the greatest imagining of Jules Verne.

"While science has made their flight possible, the great note of the achievement is that it was the old spirit of daring, courage and enterprise which brought success. The world is ringing now not only with your doings but with the great exploit of Hawker and Grieve, whose skill and pluck are acclaimed by all and rank with your performances.

"I am satisfied that the events we are celebrating to-day are but the percursors of further great developments, and that your achievement will go down in history, not only as a great triumph over the elements but as tending to strengthen the relationship between the two countries."

Engines Performed Well

Lieutenant Commander Read and his crew of the NC-4 appeared in the pink of condition when they started for London June 1. Their cheeks were bronzed and their eyes clear.

Speaking of the flight from Ferrol, Spain, to this port, Lieutenant Hinton, of the crew of the NC-4, said:

"We had no trouble. The engines performed beautifully. We might have made the flight straight across the Atlantic, but that would have taken a lot more gasolene. We had only eighty-nine gallons left after the last leg. We would need a lifting capacity of at least 1,500 pounds more before we could attempt it.

"The weather on this trip was none too favorable. There was thick fog, particularly over the Channel, where we came down to 200 feet several times. We are glad it is over, but we will do it again soon."

"Our trip really was uneventful," Lieut. Commander A. C. Read said. "We knew we would have trouble with fog, and did, but otherwise everything went off as we had planned.

"Our machine has worked perfectly ever since we left Newfoundland, with the exception of a little radiator leak yesterday."

Lieutenant James L. Breese, Jr., of California, the reserve pilot-engineer, said:

"We had all the comforts of home on the old boat. We had comfortable bunks in which we took relays for sleeping. Hot water from the radiator faucet near the bunks helped to make shaving easy.

"We knew when we were near a destroyer as Rodd (Ensign Rodd, radio operator), would tell us the radio was getting stronger. Then in a few minutes we would feel a distinct bump, and knew we were over one. It seems that the heat or smoke from the vessel has an effect on the air 700 or 800 feet up, and this caused the bump.

"I never was nervous once during the trip, but admit I have been on shorter flights. The machine did everything we asked of it. I think you can fly anywhere with a Liberty motor."

"We hardly realized that we were doing anything extraordinary at any time after leaving Newfoundland," said Ensign Charles Rodd. "We were in constant wireless communication. Both our regular and emergency sets worked well, except when the fog drove us very low and the hanging antennae got into the water."

Ensign Rodd seemed to take the whole thing as a matter of course. In fact, the more or less indifferent attitude of the whole crew caused comment among the naval and military men here, as well as civilians.

An American Welcome in London

A great, cheering crowd, composed largely of American sailors, soldiers and officers, packed the station when the train bringing the American aviators from Plymouth pulled in on June 1. The instant the train came to a stop Lieutenant Commander Read and the members of the crew of the NC-4 were the centre of a living maelstrom. They were hoisted shoulder high by their enthusiastic countrymen and paraded around the station while welcoming roars of cheering greeted them.

(*Continued on page 16*)

AIRCRAFT JOURNAL

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Army and Navy Air Services Want $128,000,000

Gen. Peyton C. March Tells the House Military Committee About the Seriousness of the Situation

Brig.-Gen. Lord, Chief of the Bureau of Finance, and other War Department chiefs explained in detail to the House Military Committee on May 31 the various items in the army appropriation bill, which totals $1,252,000,000, compared with $1,177,000,000 in the bill which failed in the last Congress.

The largest increase is for the Air Service, $83,441,000.

Estimates sent to Congress by the War Department provide for maintaining 600,000 men in France and Germany in July, 400,000 in August, and 200,000 in September. Major McKay of the Army Bureau of Finance stated that should an army of occupation be needed after October 1 Congress would be asked for additional funds.

A Very Serious Matter

Gen. Peyton C. March, Chief of the General Staff, answering a question before the committee, said:

"The organization of the Army under the so-called Hay-Chamberlain Bill is on a peace strength of 175,000 combatants, with certain staff corps not included in that total, making a total strength, in round numbers, of 230,000. The bill provided no organization for the corps which have been developed by this war, such as the Tank Corps, the Air Service, Motor Transport Corps, Embarkation and Inland Traffic Services, to mention some specific cases.

"If the Army were to revert to the organization prescribed in the National Defense Act and we tried to keep up the Motor Transport Corps, the Embarkation Service, the Inland Traffic Service, and the great storage plants we have constructed all over the United States, the Quartermaster Corps would not have in its authorized list of officers and men enough men for any one of these services to function. The personnel required for these corps separately are each one of them as strong as the entire Quartermaster Corps authorized by that bill. Furthermore, each one of those corps is in the hands of experts in their work developed by the war. The regular Quatermaster Corps is composed of officers who are not specialists in any one of those branches, and under that Bill it would be literally impossible for the Army to function except by the abandonment of everything we learned in this war.

"Of course the Air Service is the most marked case. Before the war the Air Service was a little branch of the Signal Corps, having a handful of planes and a handful of badly trained men. We have in the proposed bill made the Air Service a fourth arm, on an equality with the infantry, cavalry, and field artillery. If we revert to the old organization with the Signal Corps containing an Aviation Section, the whole Air Service would pass out of existence. It is a very serious matter and I wanted to impress it upon the committee as I did."

Secretary Baker, in explaining his request for such a large amount, agreeing with what he asked from Congress last winter, said financial needs have not changed.

"Certain plans of the Department," he said, "that are believed necessary will require comparatively large expenditures. Among them I might mention the plan to purchase and complete the Dayton-Wright flying field and to complete the Langley Field as a permanent station for the Air Service."

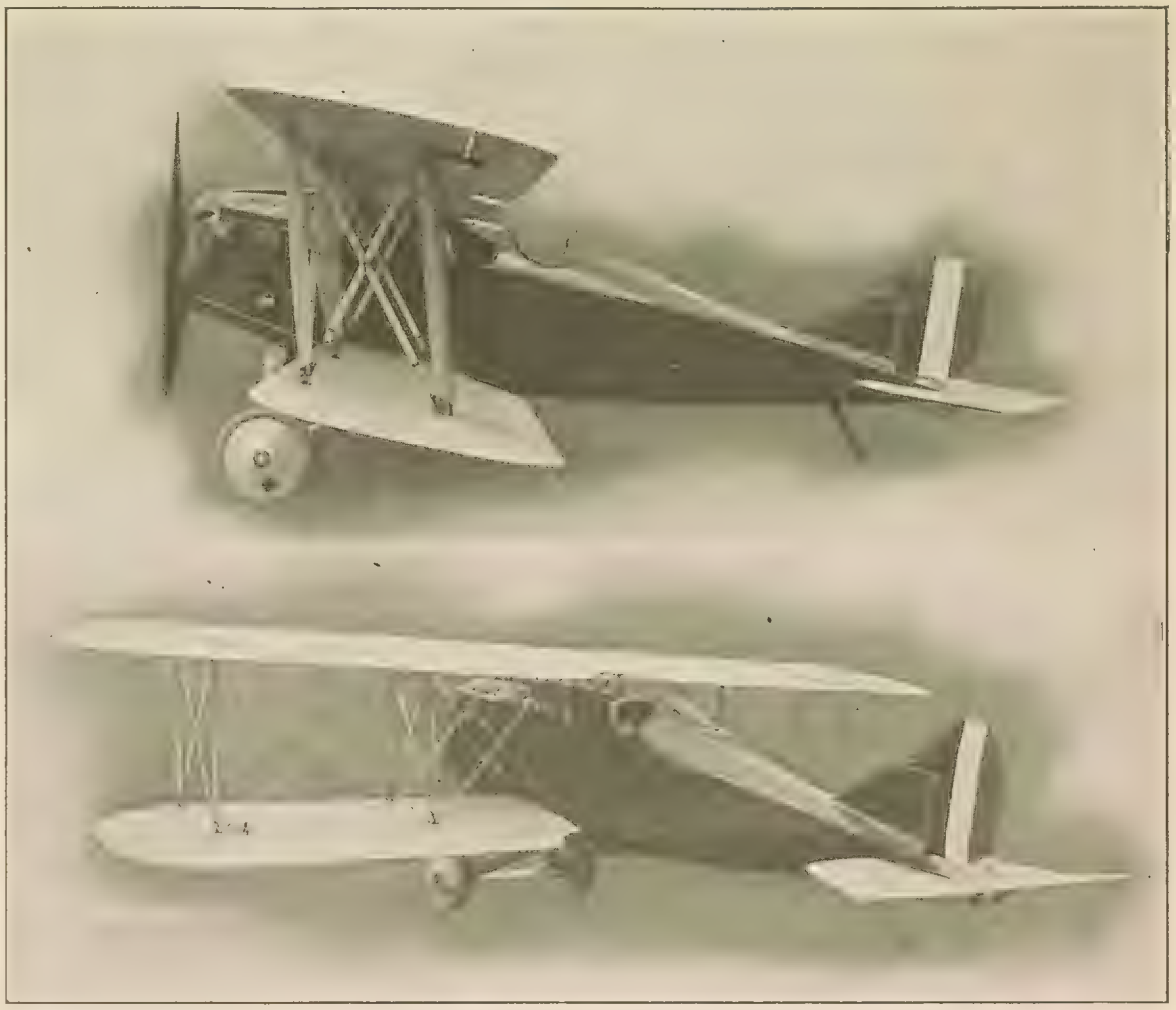
Naval Planes

The Navy estimates for the Air Service will call for at least $45,000,000. In view of the accomplishment of the NC boats, and the importance aircraft is sure to assume in the national defense, the sum may be considerably larger.

The Navy Department is so enthusiastic over the results of the first attempt at a transatlantic flight that broad plans are being prepared for expansion of the aerial program. In brief, these points are:

1. General development of aircraft necessary for the fleets, including the enlargement of seaplanes and observation balloons.

2. Extensive experimentation in the laboratory and by flying tests for obtaining improved planes of both heavier than air and lighter than air types, for service in home waters and overseas.



Ordnance Engineering Corporation type D single-seater fighter, with 300 hp. Hispano-Suiza motor. Span, 30 ft. Overall length, 21 ft. 6 in. Height, 8 ft. 3 in. Total weight, with full military load, 2355 lb. Fuel and oil for three hours' flight under full power. High speed, 157 m.p.h. Climb to 10,000 ft. in 6 min. 35 sec. The two synchronized guns are completely enclosed, yet readily accessible to the pilot. Equipment includes oxygen tank and parachute

3. Development of the rigid, lighter than air machines (the Zeppelin type), as well as the dirigibles of the C-5 type.

4. Perfection of the coastal aerial patrol service.

The Navy Department has been stirred to action by reports it has received that Great Britain was planning to build giant seaplanes for transatlantic service which would have a wing spread of 300 feet and carry twelve Rolls-Royce engines of high power. No further details concerning the plans of the English have been available, but the fact that authentic reports concerning the development of huge machines of this type are at hand was vouched for by prominent naval officials.

Casale's Altitude Record

Adjutant Casale, a French aviator, on May 28 in a flight for altitude ascended 31,000 feet. This constitutes a world's record.

NC-4's Record Stands

The French press was mistaken in its statement that the recent flight of Lieutenant Roget, the French aviator who flew to Morocco May 24, had beaten the record of the American seaplane NC-4 in flying from Newfoundland to the Azores, according to M. Breguet, the constructor of the airplane in which Lieutenant Roget made his flight.

M. Breguet points out that the distance from Paris to Rabat is not 2200 kilometers (1365 miles), as was stated, but 1800 kilometers (1116 miles), and that Roget started from a point several kilometers south of Paris and landed before reaching Rabat. The NC-4's flight on the long jump from Trepassey to Horta was 1200 nautical miles, or 1380 statute miles.

New York-Paris Prize

Raymond Orteig, proprietor of the Hotels Lafayette and Brevoort, has offered a prize of $25,000 for a non-stop flight from New York to Paris or Paris to New York by any aviator of allied nationality. His offer was made to the Aero Club of America, which has under consideration the conditions to govern such a flight.

The distance from Paris to New York is roughly 3600 miles, or more than twice that which has yet been covered by an airplane in a single flight. Mr Orteig had made his offer to stand for five years.

Ormer Locklear, Premier Acrobat of the Air

Thrilling Feats Performed by Him and Others Before the Memorial Day Spectators at Sheepshead Bay

Lieut. Ormer Locklear trifled with death standing erect on the upper wing of a speeding airplane and later jumped from one plane to another, May 30, at Sheepshead Bay Speedway.

Lieutenant Locklear's feats were the most sensational in the view of most of the crowd, but the aerial antics of Lieuts. Shirley Short and Milton Elliott, his pilots, and of Jean Momenjoz, caused the worst shudders to army and navy aviators in the crowd. Lieutenant Elliott, especially, took a long chance on his skill with the stick, when, starting at a thousand feet he come downward, his machine rolling around, upside down, with wings vertical, tail downward, and every which way, seemingly absolutely out of control, but actually under the most rigid guidance. He finished less than 200 feet from the ground with an Immelman turn and a few other rotations which seemed like certain death.

Photo Paul Thompson.

Members of the Flying Circus at Sheepshead Bay. Left to right—Lieut. Shirley Short, Lieut. Ormer Locklear, Lieut. Milton Elliott

Locklear's Daring Feat

Lieutenant Locklear's most daring trick came at the end of the program. Curtiss plane No. 7, with Lieutanent Elliott at the stick, on whose eye and arm Locklear usually depends most for his safety, went out of commission just before the aerial derby, so he went up in the plane of Lieut. H. B. Shields. Higher and higher the plane mounted, followed by another Curtiss plane piloted by Lieutenant Short.

Finally at probably a thousand feet Lieutenant Short dropped over the side a flimsy looking rope ladder, which was sent whirling bockward by the force of the speed of the plane. Then the risky work began, the business of getting the two speeding planes sufficiently near and yet not near enough for the collision which would mean death for three men. To add to their difficulty the two pilots, their planes making better than 60 miles an hour, must get together at just the right time so that the public, sitting comfortably in the stands, could see the whole thing at as close range as possible.

Black against the blue sky the figure of Lieutenant Locklear suddenly appeared in the upper wing of Shields' plane. He stood erect, his body inclined against the rush of air which would throw an average man to his face on the ground, his arms stretched outward and his head up, with eyes fixed on the swaying ladder dangling from the plane above. Slowly, almost imperceptibly the machines drifted together, while Locklear somehow retained his footing on the smooth, curving surface of the plane.

Has No Imitators

Then the ladder swung for an instant within reach. Locklear grasped at it, and as he did so the plane below dived downward and the one above loomed upward with his body swinging below the ladder. He had successfully accomplished once more the feat in which he has as yet no imitators.

Lieutenant Locklear had begun his exhibition in or rather on Lieutenant Elliott's plane at a much lower altitude, walking out on the lower wing and thrusting one arm and leg outward into space, standing erect on the upper wing, sliding down to the tail and crawling up again and dangling by his knees from the axle of the plane with head downward.

The Aerial Derby

Four men started in the aerial derby, an alleged race of 20 miles in which the pilots, Domonjoz and Lieutenants Shields, Short and Micelli, rested themselves and their spectators by some straight flying. Little Domonjoz and his Bleriot, which, it is said, is a 1913 model, were left far behind by the other pilots. To soothe his feeling Domonjoz left the race flat and went further aloft to comfort himself and soothe his machine by a little more upside down flying. He refused to come down until long after the race was over and Locklear was about to perform his most dangerous trick.

The other pilots buzzed around the 2-mile track and over the stand about ten times, and then speeded up for the finish, making real speed for a few moments. Lieutenant Shields was officially first, with Lieutenants Short and Micelli following. The time was 16 minutes 45 seconds.

Resents Hawker's Slur

Ormer Locklear, airplane acrobat, has wired to Secretary Daniels as follows:

"Like all red-blooded Americans, I resent the slur cast by Mr. Hawker on the great flight across the Atlantic by our naval fliers. To prove that Britain has no corner on courage among fliers I deeply desire to make an attempt to fly to Europe under conditions identical with those surrounding the Hawker attempt. I wish no convoys nor assistance from the government, except to be supplied with an able navigator. I am sure there are many men in your service who gladly will volunteer to make the trip with me. I am asking the American airplane and motor builders to join me in the attempt.

"I propose to defray all my personal expenses, pledge the London *Daily Mail* prize, if won, to the Red Cross, and agree not to accept one penny from any source as a reward."

Locklear purposes to start within thirty days without any long drawn out preliminaries.

American Aces Home

Many American fliers who won distinction on the French front arrived May 31 on the transport Louisville. The vessel brought 1,897 officers and men. They made up three photograph squadrons, the 5th Aero Squadron and the 94th Pursuit Squadron, which formerly was commanded by Capt. Eddie Rickenbacker.

It is said the 94th has more "aces" than any other unit in the fighting forces. It has to its credit sixty-nine German planes and a creditable number of observation balloons brought down. The squadron returned in command of Major R. M. Chambers of Memphis, Tenn., who is 24 years old and has won the Legion of Honor, the D. S. C., and Croix de Guerre. It was the first pursuit squadron on the American front, and the only one selected to accompany the Army of Occupation to Coblenz.

Returning with the squadron are such fliers as Weir Cook of Indiana, who brought down seven enemy planes; Sam Kaye of Columbus, Miss., who has five planes to his credit; Joseph Dawson, Willie Palmer, and John Jefferts of Los Angeles, all aces.

A committee composed of members of the Flying Club, of which L. L. Driggs is president, welcomed the squadron and escorted the men to the Hotel Commodore.

Pictures of Heroes Sold

Henry C. Frick has purchased the portrait of Col. Raynal C. Bolling in the collection of twelve portrait drawings by John Elliott of distinguished Americans who sacrificed their lives in the war. Mr. Frick has also purchased the fine portrait of Norman Prince. Among other pictures sold are those of Quentin Roosevelt, depicted gazing laughingly backward over his right shoulder and looking the living image of his father; purchaser, Mrs. Elon Hooker of Greenwich, Conn.

Notes on Technical Aeronautics

True Cause of Cylinder Knock

In a recent extremely interesting paper on "More Efficient Utilization of Fuel," read before the S. A. E. by C. F. Kettering, a very interesting study was made of cylinder knock. In the Internal Combustion Engine, as fuels of lower specific gravity came into use, it became necessary to use lower compressions, the general idea being that this lowering of compression was necessary because of preignition. To study the problem and investigate whether lower compressions were absolutely necessary, an indicator was developed which gave a new but very satisfactory type of indicator card. As a result of this work it was discovered that the knock in a cylinder may be an entirely different thing from preignition. Hundreds of indicator cards were made with this instrument and each of them was very different from the usual pressure-volume card secured with the ordinary indicator. In Fig. 1 is shown a card taken with the usual type of indicator. In Fig. 2 is a series of cards taken with the new type indicator on a pressure time basis, the principle being evident from the diagrams.

One of the cards in Fig. 2 illustrates the normal burn in an engine cylinder without any evidence of a knock. It is evident from this card that pressure begins to go up at the instant the compression stroke of the piston is started and increases uniformly until ignition after which pressures go up rapidly to a maximum and taper off gradually during the work of the piston. Another card made with the new indicator illustrates a case of true pre-ignition. The true cylinder knock is shown in another card occurring fairly early in the combustion stroke, while in still another it occurs at approximately 25 degree after top center and on the down stroke of the engine.

These cards proved tremendously interesting and really made possible a study of cylinder knock. The conclusions reached were somewhat as follows. If a complex molecule is taken and starts to burn, it will not burn by a single step from the carbon and hydrogen into carbon dioxide and water, but as it starts to break down it may be decomposed into a variety of compounds. If during this burning there should be liberated for an instant, as an intermediate product of combustion some compound of an extremely explosive or denotable nature, you would upon explosion of these compounds, get such a sudden rise in pressure as is indicated in the cards shown. The compounds thus formed will differ, depending upon the pressure and temperature conditions at the time the explosion takes place.

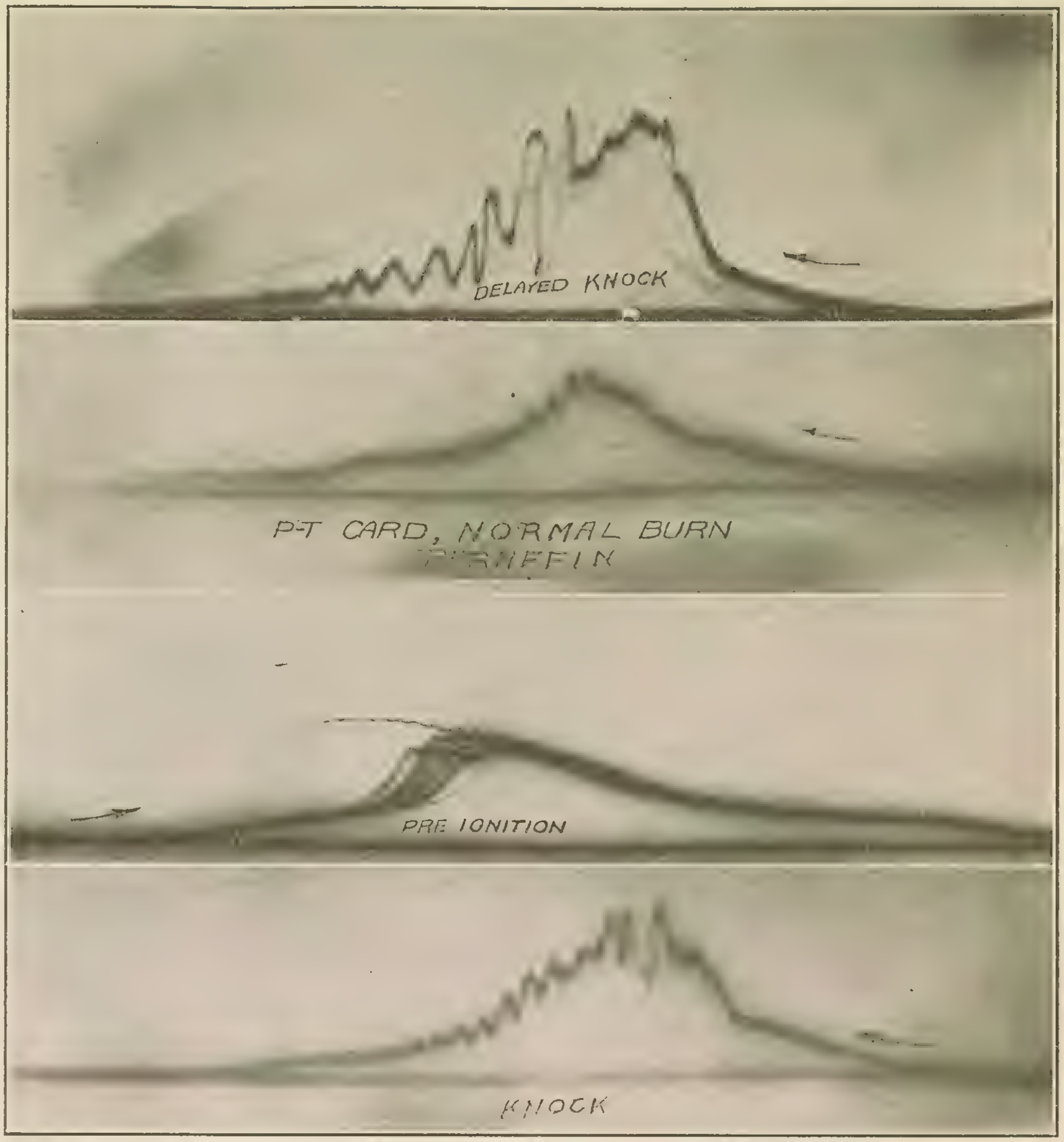


Fig. 2—Pressure time indicator cards secured by a special internal combustion engine indicator which show typical operating conditions

In studying the conditions existent within the cylinder during knocking, it was endeavored to get an actual view of conditions within the cylinder at the time the knocking took place. To do this a window was put in the cylinder and a spectroscope pointed at this window. In this way it was possible to reach a definite conclusion that the compound which caused the trouble is acetylene.

The deduction drawn from this was that if a fuel could be found which would burn by a single step from carbon to carbon dioxide and from hydrogen to water then knock would be eliminated. Such a fuel was found in cyclohexane, C_6H_{12}. Experimentation with this fuel lead to the following conclusion. If a fuel burns by a single step from carbon to carbon-dioxide and from hydrogen to water, the explosion will be absolutely independent of the compression because the temperatures and pressures can only rise to such points in the cylinder as the products of combustion permit. That is the temperatures of combustion cannot rise above the disassociation temperatures of the products which result from such a combustion. Consequently when this fuel is used in an engine cylinder there will be a pressure-volume card that looks like a steam engine card. And without materially raising the explosion pressures this fuel can be run on any compression up to the point of actual pre-ignition caused by the temperature rise due to compression reaching the ignition temperature of the fuel. The lowering of compression prevents knock with other fuels simply because lowering the compression results in a substantial lowering of the combustion temperature within the engine cylinder.

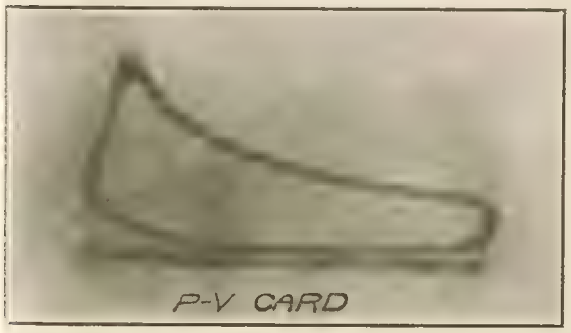


Fig. 1—A typical pressure-volume card secured from an internal combustion engine

For testing cyclohexane a Liberty-engine was built having 200 lbs. compression and was run without any knock whatsoever, whereas with the best grades of gasoline a no compression in excess of 125 lbs. could be used.

The investigation thus leads the way to the utilization of higher compressions, and consequently the possibility of more work being obtained for the same volume of cylinder. The continuation of these studies will be intensely interesting to the airplane engine builder.

International Air Rules

"The seventh and eighth meetings of the International Convention on Aerial Navigation, which body is also the Aeronautical Commission of the Peace Conference, were held on April 15 and 16," says an official report. "Admiral Knapp and Major-Gen. Mason M. Patrick represented the United States.

"The commission had before them full reports from their commercial, legal, financial and technical sub-committees. There were forty-one articles in the draft convention and six annexes.

"On the question of aircraft, the analogy of merchant shipping has been followed to a certain extent, the main principle being that the nationality should be governed by the nationality of the owner of the aircraft."

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Formerly Air Service Journal

Too Commercial

IT is unfortunate that the Trans-Atlantic flight should have aroused such bitterness in the hearts of our English competitors. Commencing with the *Aeroplane's* warning to all English fliers to avoid the American mainland because commercial interests or mercenary gamblers would tamper with the engines or dope the pilots, and culminating in Harry Hawker's belittling of Read's flight, the English have shown that the undertaking has been regarded more from a commercial than a sporting aspect.

It is well known that makers of engines abroad are doing all they can to reflect discredit on the Liberty engine. Hawker, after landing, immediately gave out a eulogy on the Rolls-Royce engine, stating that the engine ran splendidly, but a little solder stopped the water circulating system. Just how he knew this without taking down his engine assembly is not apparent. It is a fact, however, that the twelve Liberty engines on the NC-1, NC-3 and NC-4 all carried these planes further than any heavier than air craft have flown before.

The fact that the Navy's achievement was for information and that every safeguard was utilized has caused the English public to consider the Hawker flight of greater interest than the successful crossing of the NC-4. The English press has done much to counteract the unfortunate feeling that has been created and probably will stop much of the commercialized chatter in interviews of the future.

Lighter-Than-Air Craft and the Services

FREE balloons, kite balloons and airships are receiving more and more attention from the Army and the Navy.

The value of the free balloon in the instruction of prospective pilots of lighter-than-air craft can hardly be overrated; indeed, the handling of free balloons not only gives the pupil the necessary fundamentals upon which he will eventually build up his knowledge of aerostatics: it also teaches him to estimate the lay of the land, to judge meterological phenomena at their proper value, besides affording valuable indications as to the upper wind currents. Therefore the sport of free ballooning should receive all the encouragement possible so that in case of emergency the government will be able to draw upon a reservoir of men familiar with the fundamental mechanics of lighter-than-air craft.

The importance of the kite-balloon in artillery observation work has been sufficiently demonstrated during the war. It might be noted, however, that considerable progress is being achieved in simplifying the structure and in reducing the size of K. B.'s, all of which will result in a greater all round efficiency.

Perhaps the most interesting symptoms showing the increased interest of the Services in lighter-than-air craft is the recent introduction of airships into the Army Air Service; this type of aircraft having hitherto been exclusively handled by the Navy.

The Army has on order, or actually delivered, half a dozen small nonrigids, which it intends to use for coast artillery observation work, as it is contended that these craft possess over the kite-balloon the advantage of mobility, and therefore lesser vulnerability to artillery fire. On the other hand the Army Air Service urges the establishment of airship bases throughout the country as a far-sighted commercial policy and a material assistance to the civil departments in new enterprises. Particular attention is called to the use of airships in connection with the Department of the Interior in making maps, with the Bureau of Mines for carrying prospectors over difficult country, with the Forestry Service for the surveillance of timber area, with the Fisheries for detecting schools of fish, etc.

All this points to the varied uses which await the modern airship and shows that the government agencies are fully aware of its great possibilities.

Congress and the Air Services

WITH $128,000,000 asked for by the Secretary of War and the Secretary of the Navy for the Air Services next year, it becomes apparent that the importance of aeronautics has taken deep root in government soil.

The Chief of Staff has stated that the Air Service was to be organized as the fourth arm of the Army, a new development from the old General Staff point of view. If this attitude prevails in the Congressional committees it will do much to prevent the partisans of an independent Air Service making progress.

At this time, when all legislation before Congress is in a formative stage, little can be surmised as to the eventual outcome. Soon statements will be made by those who have the final deciding vote, and then the country will know where the Air Service stands in Congress.

Are Acrobatics Helpful?

JUST what effect the flying circus plan of promoting aviation will have is difficult to judge. From the military standpoint every form of stunting is helpful as it not only tests the capabilities of machines but demonstrates the skill of pilots. Lieut. Locklear's astounding feats have certainly made him the foremost aerial acrobat in the world. This reflects great credit on the skill and daring of American pilots.

But the public which has to become interested in the possibilities of the airplane as a passenger carrying medium may come to regard aircraft as too much of an acrobatic vehicle and not realize that stunting is only a test of the ultimate strains to which machines could be put.

Cross country flying is the best sort of work an aeroplane can do to demonstrate the reliability, safety and practicability of aircraft. The flights of the Army pilots over all sections of the country have made air travel almost as commonplace as motoring. It is to be hoped that the stunting with its attendant risks will not give the airplane a bad reputation.

Forced Landings

A RECENT aerial mail report deals with the subject of forced landings. It would seem as if in a year's flying, all forced landings were accountable to the power plant. The classification reads, Distributor 1, Magnetos 5, Generator 1, Radiator Water Trouble 8, Bad Valves 2, Gas Pressure Leak 2, Oil Pressure 7, Carburetor 2, Plugs Fouling 8. In no case was landing due to failure of the controls, or a structural defect in the plane.

With the employment of twin or multiple engine machines, improvement in spark plugs, more careful oil pressure systems, and other mechanical improvements, on which attention is centered in many quarters, the outlook for an uninterrupted service will become very hopeful.

Uses of Army Airships in Times of Peace

Gen. Charles T. Menoher, Director of Air Service, Authorizes the Statement Here Printed

Gen. Charles T. Menoher, Director of Air Service, authorizes the following concerning the relation of Army airships (dirigibles) to the civil departments and to commercial enterprises in time of peace:

1. The establishment of army airship bases throughout the United States and its colonial possessions will be a farsighted commercial policy and a great help to the civil departments in new enterprises.

Airship sheds, gas plants, store houses and landing fields involve a large first cost and take a long time to procure or construct. Quite a large landing party is also required at each station.

An army airship working, for instance, with the geological or forestry survey or the post office could be housed on an army reservation and be handled by a party of soldiers in its visits for fuel, etc., it would cost much less to operate for the survey and would help keep the army airships employed in profitable work. Airship gas bags are perishable and it takes great skill to manufacture them. It is expensive to replace a bag every two or three years and very unsatisfactory when it lies idle or is used merely to make practice runs. This same expenditure of time, gasoline, oil and repairs can serve a double purpose if the airship is used to help in transportation, surveys, bandit hunting or scientific researches.

2. That civil use most vital to the army is to assist the Department of the Interior in making the maps of the Geological Survey, which are the basis of the Progressive Military Map. The Coast and Geodetic Survey can also use the dirigibles especially over the vast coastal marshes where small details require large expenditures on account of difficulties in transportation.

The dirigible can transport survey parties with instruments and supplies to and from the tops of difficult mountains, to triangulation stations in wilderness and to small islands that have poor landing facilities.

3. The dirigible will be able to help the Mail service. In the great forests and mountains the dirigible is not handicapped in navigation, its compasses are steady and reliable. It can stand still over a neighborhood and by signals make its presence known to ground parties who can tow it in to a landing place, even in a thick fog. If the landing place is very small the airship can drop its guide rope and be pulled down among the hills and trees. There are many logging and mining camps that could get better mail service if there were airships available. The Yukon valley could have excellent mail service in summer if it had an airship line.

4. The dirigible will be useful to the Bureau of Mines because it can carry prospectors at low altitudes as they search for symptoms of minerals. It can fly close to the faces of great cliffs and along the steep slopes of the higher mountains. Over the deserts it will save great hardships. It can deposit prospectors with tools, instruments and supplies in neighborhoods needing close scrutiny and returning can take them out with their ore samples and data. If the period of search is long frequent visits with mail and supplies will be in order.

5. The Forestry service can use the dirigible to cruise timber areas, watch forests and visit areas under special investigation. It can supply lumber camps with light supplies and mail and bring passengers to and fro. With the dirigible it will be possible for scientists to closely watch the leafing, flowering and shedding periods of large areas. The tree life on difficult mountains can be more closely studied. Seeds may be spread over new areas. The action of fires can be closely watched and fire fighters can be let down where needed. In tropical forests trees of great value can be hunted for by their flowers, leaves or other symptoms seen from above without sending white men into the insect ridden jungles.

6. In the river and harbor work the dirigible can study the snow areas, the flow of tributaries and even stay out for days while the engineers in charge can study the progress of floods. With this better knowledge the probable extent of floods can be predicted with great accuracy and more intelligent means taken to control the rivers. The tide rifts can be studied from great altitudes and harbor improvement work will be benefited. Reefs can be detected on clear days and charted.

7. In studies of animal and insect life the zoologist and entomoligst can have the same facilities as were explained for geologist. Transplanted animals can be more closely watched. The great deer herds of Alaska can be protected better. Illegal drives can be stopped. In countries where migratory insects like locusts need surveillanc, scientific measures can be taken to find their breeding places and sterilize the egg laden areas. A dirigible can follow a locust cloud and by the use of gases and explosives disperse it or drive it away from valuable crops.

8. The fisheries can use the dirigible to detect schools of fish. These look like clouds on the water and from high places can be pointed out to fishing fleets the same as the Philippines use the hills near Manila Bay.

9. The Revenue Guards and the Department of Justice can use the dirigible to detect smugglers and to pursue large bands of outlaws, especially if they are mounted or have stolen livestock or property in vehicles. The Military and civil patrol of the Mexican Border will be able to cooperate in suppressing international lawlessness.

10. The Department of State will find the dirigible especially valuable in carrying out diplomatic missions in time of war or peace. Great secrecy is possible and great economy of time. For instance trips to Ecuador are possible and missions to other landlocked countries can be managed even though enveloping territories object, since the route cannot easily be closed or even proven.

11. The consular service will be able to visit remote regions in search of commercial data. It will often be possible to warn our nationals of impending famines or eras of plenty. Samples of new or improved products of remote places can be obtained even though there are no good land or water routes.

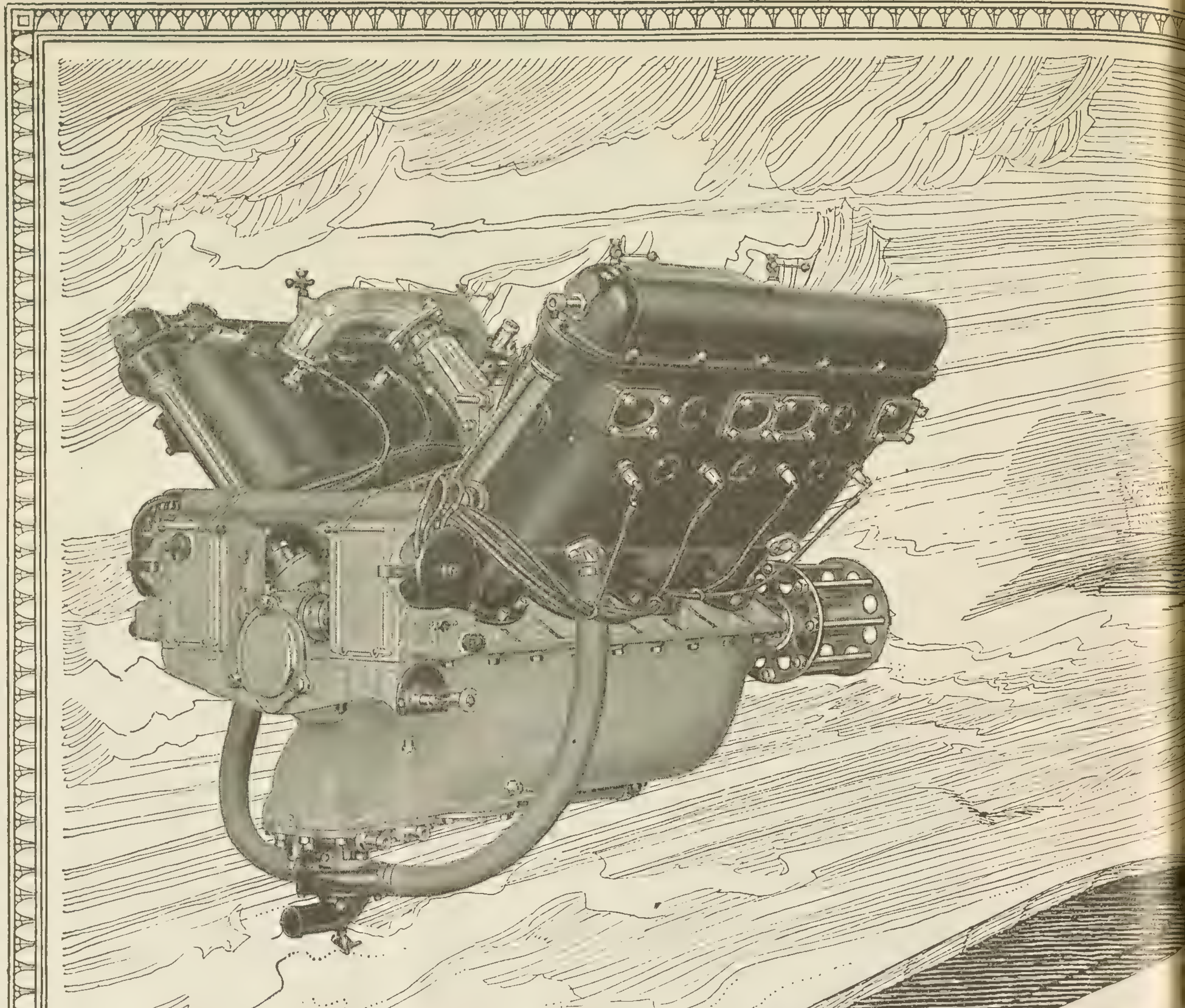
12. The Department of Agriculture can use the dirigible to analyse crop conditions. A dirigible can travel a thousand miles in twenty-four hours. A good judge of crop conditions can thus survey in person an entire state like Ohio in very few days. It is in the great plains of the north west that such a use is most valuable.

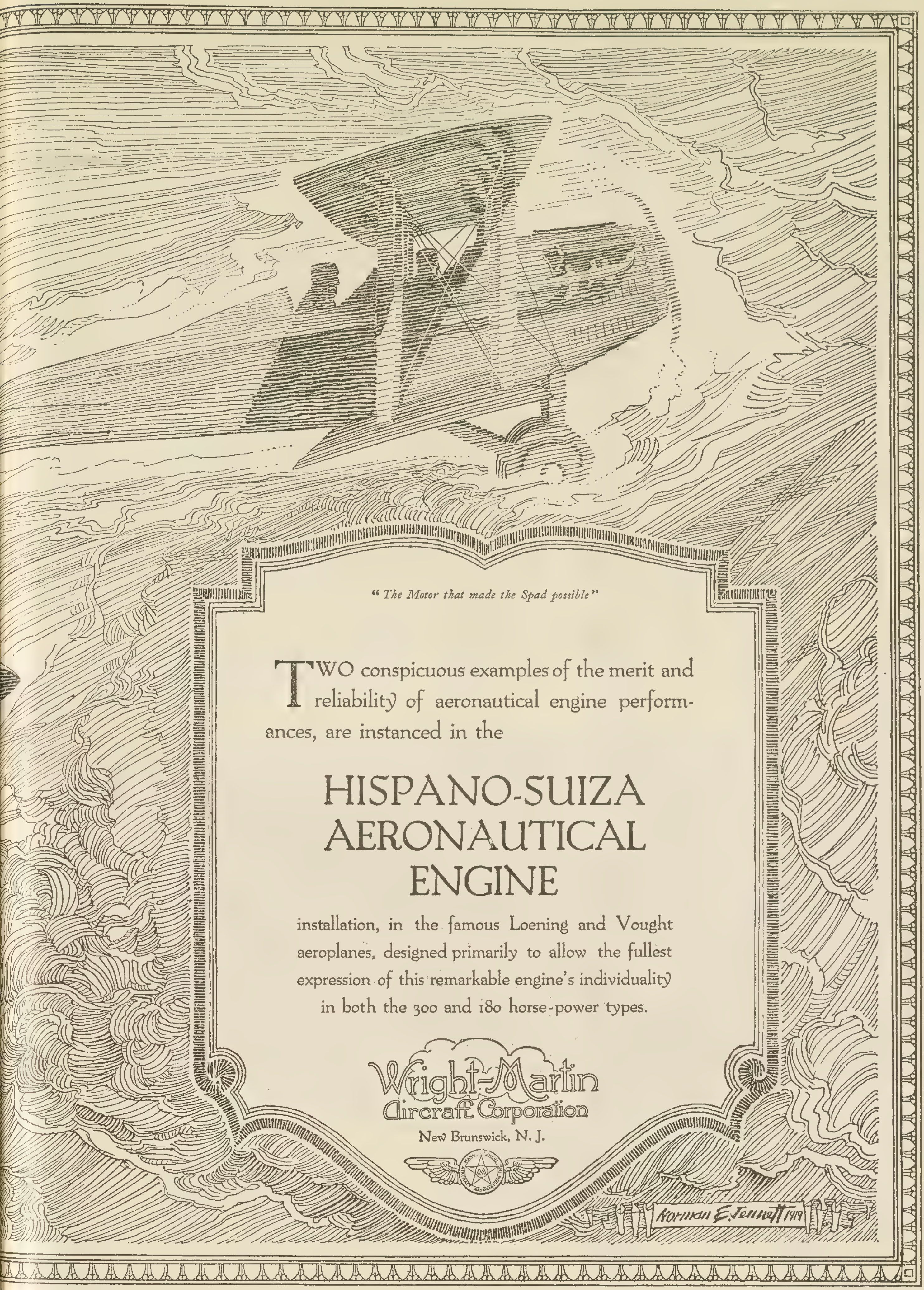
13. In states in which the use of the airplane on account of the wildness of the country may be limited—such states will have airship service in order to keep in touch with the times.

New Army airship A-4 ready tc start

New Looping Record

A feature of the week was the new world's record established at Carlstrom Field in looping by Lieut. Ralph J. Johnson who has many unrecorded stunts to his credit. He was accompanied by 2nd Lieut. Mark R. Woodward as a passenger. Johnson made 457 continuous loops in his Lapere Fighter in one hour fifty-four minutes and ten seconds. His elevation varied from 6000 to 4000 ft.





"The Motor that made the Spad possible"

TWO conspicuous examples of the merit and reliability of aeronautical engine performances, are instanced in the

HISPANO-SUIZA
AERONAUTICAL
ENGINE

installation, in the famous Loening and Vought aeroplanes, designed primarily to allow the fullest expression of this remarkable engine's individuality in both the 300 and 180 horse-power types.

Wright-Martin
Aircraft Corporation
New Brunswick, N. J.

Expert Opinions on the NC-4's Flight

President Russell's Statement

"The United States Navy did not place destroyers every 50 miles because of lack of faith in the Liberty motor. Contrary to the suggestion attributed to Hawker, the sea lane was established because we did not know how the NC boats would stand up under storm. Would they be capable of holding together in heavy seas until rescue came? The answer was found in the demonstration.

"Had Hawker possessed a machine suitable to the element over which he sought to fly he might have repaired his engine and then gone on."

Such was the comment on the successful flight of the NC-4 and the attempt of Hawker to fly across the Atlantic made by Frank H. Russell, president of the Manufacturers' Aircraft Association. He predicted the NC-4's successful flight would be duplicated and exceeded by still larger craft.

"The flight demonstrates," he said, "that aerial navigation has developed to a point where it commands recognition as a coming means of general transport over both land and sea. Members of the Manufacturers' Aircraft Association rejoice over Lieutenant Commander Read's achievement, not only for what it means today, but what it presages for the future.

Opening Stage of Aeronautics

"The first flight in a heavier-than-air machine as made by the Wrights at Kitty Hawk, marked the opening stage in aeronautics; the NC-4's remarkable trip marks the second, and—granting the proper encouragement from the public, which is so necessary to a new enterprise—we may expect to see many voyages of greater duration than that from Trepassey Bay to Ponta Delgada.

"Engineering designs which American manufacturers have under way assure this natural development. Already larger and more powerful flying watercraft are under construction.

"The most interesting feature of the transatlantic flight to our mind is proof that a machine can be constructed capable of flying far, of riding out a gale at sea and of coming into port under its own power.

Landing Facilities

"This brings up the subject of landing facilities. No greater problem is presented to the American airplane industry in its effort to develop commercial aviation than that of obtaining safe and adequate landing fields. A hydro-airplane, seaplane or flying boat may alight on the water. But much of the future flying will be over land—must be over land if aerial navigation is to become more than an auxiliary to commerce. The transatlantic flight should inspire American cities to move quickly to establish landing fields, laid out according to Federal standard, so they may be ready for the transcontinental air liner which is coming just as surely as we have proved it possible to cross the Atlantic.

"The overseas flight also proved how practicable it is for the Government to cooperate with industy. The Secretary of the Navy has manifested a very broad and liberal attitude in his evident realization that in the future, although the official bureaus are capable of going ahead rapidly and making great progress, real development depends upon the initiative and enterprise of individual aeronautical engineers and manufacturers."

General Brancker's Statement

Major-Gen. Sir Wm. S. Brancker, R. A. F., gives expression to the following views concerning the trans-atlantic flights:

"Two great efforts have been made to fly across the Atlantic. One has failed gloriously; the other has succeeded. The two attempts, although simultaneous, were carried out under very different conditions.

"The time is propitious to crystallize thoughts as to what has been accomplished.

"The Americans started first. Their effort, organized and guided by the government, skilfully and thoroughly planned, was carried out along sound, practical lines. One of their three flying boats accomplished the great feat of traversing 1500 miles of uncharted Atlantic air, making a comparatively small objective with perfect accuracy.

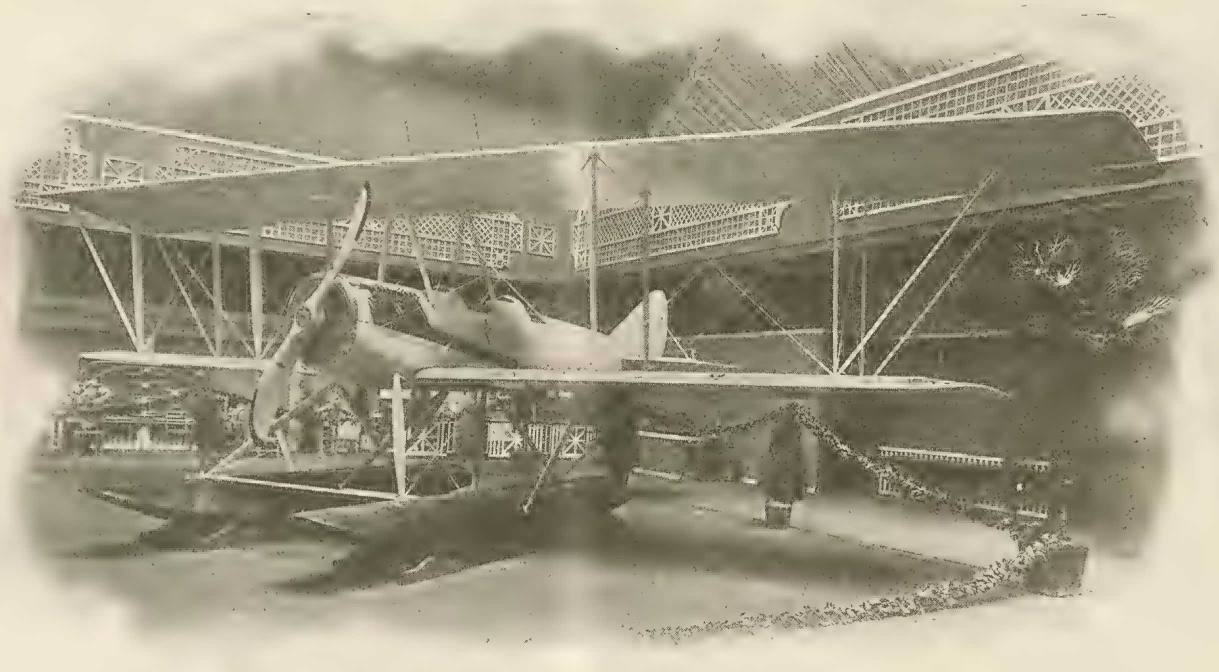
"On the other hand, however, two of the three starters failed to reach the objectives, and had it not been for the thoroughness and efficiency of the American naval organization both of these boats might well have been lost. The causes for the failure of one certainly were navigational; concerning the other we have no clear information.

Wise Preparations Promised Success

"The whole enterprise promised to be successful from the first, owing to the route taken, the methods employed and the thoroughness of the organization.

"The British undertaking was of different character. As soon as the armistice was declared, stirred by the offer of "The Daily Mail" prize, personal initiative produced several independent starters, three of whom actually reached Newfoundland. As is always the case in the history of Great Britain, personal initiative outstripped government policy and prevented cooperation. After weary weeks of waiting under the most difficult circumstances, the departure of the American flying boats stirred Hawker and Raynham into an attempt to reach Europe first at all costs, even though weather conditions were not perfect.

"They both labored under greater handicaps than the three American boats. They had almost 2000 miles of ocean in a notoriously bad weather zone to cross, and the size of their airplanes precluded anything like really accurate navigation.



"THE SEAGULL"—Sport Seaplane

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Why the British Failed

"Disaster overtook both. The Martinsyde 'plane, overburdened with the huge load of petrol required for so long a flight, failed to get off the ground satisfactorily and crashed. One of the many weak links in the engine installation brought the Sopwith down into the water, where, with incredible good luck, a ship picked up the aviator.

"Hawker has accomplished a great feat, and his fourteen hours' experience should prove of inestimable value to those who wish to follow.

"What has been proved and what have we learned by these two daring enterprises?

"First and foremost, I think that the effect that weather has as a factor in all aviation has once more been accentuated. Even in the more favorable conditions of the Azores route, the American flying boat was delayed several days at its half-way house. Hawker's description of weather conditions during his aerial voyage makes one wonder whether he could have won even though his water system had not failed.

Weather Forecasting Important

"Undoubtedly as weather reporting improves in efficiency and we gain experience we will be better able to conquer the elements, even with our existing aircraft, but it is pretty evident that at the moment the weather alone must prevent heavier-than-air craft from being used as a practical means of crossing the Atlantic. This brings one back to the fact that the heavier-than-air craft are unsuitable for long voyages, if they are to be used daily and regularly.

"There are few weather conditions bad enough to prevent a good pilot with a modern airplane from flying a short distance over a well marked, well known course, but the longer the distance and the less defined the course the greater will be the number of days on which the pilot will not get through.

This is the bedrock upon which the commercial aviation of the future must be built, and the unsuitability of heavier-than-air craft for long through voyage, if reliability and speed are to be depended upon, is vividly exemplified by the gallant attempts to cross the Atlantic by this means.

Big Plane Has Better Chance

"A big airplane has a better chance certainly than a small one on these long trips, from the fact that navigation can be carried out with adequate space and comfort, and so give a far better chance for accurate results, but when the distances on short routes are well marked and the need for navigation vanishes. Also for long routes the multiplicity of engines gives an added factor for safety. Certainly if one motor stops when the machine is fully loaded she must come down, although she may have four motors; but on the other hand, after a portion of the heavy cargo of fuel has been consumed, she should be able to fly with one motor out of action.

"Hawker's failure is typical of the weakness of the one-engine machine. Probably at the present moment the weakest link in the reliability of the airplane is the installation of the engine petrol supply, oil supply, water supply, magneto, etc. The engines themselves, with proper care, have in some cases reached almost perfect reliability, running for many hours.

Lessons Learned

"First, the unsuitability of heavier-than-air craft for really long journeys.

"Second, the necessity for choosing an aerial route so as to obtain the best weather conditions.

"Third, that if long voyages are undertaken for some reason, navigation is of far greater importance than actual pilotings.

"Fourth, that in both initiative and design American and British nations are leading the world.

"The Atlantic has been flown over this year by way of the Azores, but on a direct route there is no such certainty. All luck be with those who attempt this heroic feat!"

May Start June 12

Three machines are being prepared in Newfoundland for flights across the Atlantic. They are the following:

HANDLEY PAGE—Wing spread, 126 ft.; length, 65 ft. Pilots, Major H. G. Brackley, D. S. C., and Rear Admiral Mark Kerr, R. N., retired. Navigator, Major Tryggue Gran. Power plant, four Rolls-Royce 375 hp. engines. Speed, 90 miles an hour. Approximate starting time, June 12, time of the full moon, to June 22, the longest day.

VICKERS-VIMY BOMBER—Wing spread, 67 ft.; length, 42 ft. 8 in. Pilot, Capt. John Alcock, D. S. C. Navigator, Lieut. A. W. Brown. Power plant, two Rolls-Royce 350 hp. engines. Speed, 100 miles an hour. Approximate time of starting, June 10 to June 22.

MARTINSYDE—Wing spread, 41 ft.; length, 26 ft. Pilot, Frederick P. Raynham. No navigator yet found in place of Capt. C. W. F. Morgan. Power plant, one Rolls-Royce 285 hp. engine. Speed, 100 miles an hour. Approximate time of starting, June 10 to 22.

Arrangements are also being made for entries by Bolton and Paul and by the Alliance Airplane Company.

Aerial Jazz at Upton

Several famous aviators flew from Hazelhurst Field, Mineola, to Camp Upton recently, to put on on exhibition of "aerial jazz" in the interests of the recruiting campaign now under way at the camp. The aviators did various stunts such as the Immelman turn, the loop-the-loop, the tail spin and the barrel. Colonel Archie Miller, in command of Hazelhurst Field, was in charge of the air squadron.

DURING the last two years, Goodyear balloons have traveled more than two hundred thousand miles.

In this time and over this distance they have carried more than thirty-six thousand passengers—without a single fatality.

This can be taken as a promise of what tomorrow holds for Aeronautics—as an indication of the future accomplishments of Goodyear balloons.

But behind this present impressive Goodyear record is a foundation of nine years of Goodyear pioneering.

It includes an intensive study of aeronautics that has developed Goodyear balloon men of unquestioned authority.

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Balloons of any Size and Every Type
Everything in Rubber for the Airplane

GOODYEAR
AKRON

Air Service Fields

The War Department has decided to abandon the following flying fields: Barron Field, Ft. Worth, Texas; Call Field, Wichita Falls, Texas; Carruthers Field, Ft. Worth, Texas; Eberts Field, Lonoke, Arkansas; Love Field, Dallas, Texas; Payne Field, West Point, Miss.; Rich Field, Waco, Texas; Taliaferro Field, Ft. Worth, Texas; Taylor Field, Montgomery, Ala.; Gerstner Field, Lake Charles, La., as soon as equipment now in storage at these fields can be disposed of.

The abandonment of Gerstner Field will be completed by June 30, 1919. It is intended to sell or salvage the buildings and improvements unless they can be utilized to advantage by some other department of the Government.

Fifteen flying fields and five balloon schools are to be held by the Air Service as permanent training fields:

FLYING FIELDS

"GOVERNMENT OWNED"

Rockwell Field, San Diego, Cal.
Langley Field, Hampton, Va.
Post Field, Fort Sill, Okla.
Kelly Field No. 1, San Antonio, Tex.

"LEASED—TO BE PURCHASED"

March Field, Riverside, Cal.
Mather Field, Sacramento, Cal.
Carlstrom Field, Arcadia, Fla.
Dorr Field, Arcadia, Fla.
Ellington Field, Houston, Tex.
Park Field, Millington, Tenn.
Souther Field, Americus, Ga.
Selfridge Field, Mt. Clemens, Mich.
Scott Field, Belleville, Ill.
Chanute Field, Rantoul, Ill.
Kelly Field No. 2, San Antonio, Tex.

BALLOON SCHOOLS

"GOVERNMENT OWNED"

Balloon School, Lee Hall, Va.
Balloon School, Ft. Crook, Neb.

"LEASED—TO BE PURCHASED"

Balloon School, Arcadia, Cal.
Balloon School, San Antonio, Tex.
Balloon School, Ft. Omaha, Neb.

PERFORMANCE OF AIR MAIL AVIATORS, MAY 15, 1918—MAY 15, 1919

	Perfect Flights		*Forced Landings Interrupted*	*Forced Landings Uncompleted*	*Total*	
Pilot	*No.*	*Miles*	*Flights*	*Flights*	*No.*	*Miles*
Lt. J. C. Edgerton	52	7,020	1	0	53	7,155
Lt. Stephen Bonsal	39	4,680	1	4	44	5,025
Lt. Walter Miller	48	4,590	2	2	52	4,960
Lt. T. H. Webb	41	3,690	1	0	42	3,780
Lt. E. W. Killgore	39	5,175	3	2	44	5,670
Lt. H. P. Culver	35	3,375	2	0	37	3,645
Lt. G. L. Boyle	0	....	0	2	2	114
Lt. Gordon Dodge	9	1,035	2	2	13	1,485
Max Miller	82	9,242	0	0	82	9,242
Dana C. De Hart	179	20,324	7	5	191	21,360
Edw. V. Gardner	97	10,858	3	2	102	11,422
Robert F. Shank	129	13,700	4	5	138	14,334
M. A. Newton	73	7,634	1	2	76	7,875
Dunn K. Steele	5	506	2	3	10	859
Louis Gertson	4	436	0	0	4	436
Leon D. Smith	67	7,314	2	13	82	8,292½
Lawton V. Smith	45	4,866	0	2	47	4,926
Lester F. Bishop	3	346	0	1	4	354
John M. Miller	4	368	0	0	4	368
Chas. I. Stanton	2	218	0	0	2	218
Lyman Doty	3	308	0	2	5	369
Trent C. Fry	7	724	0	2	9	774
Irving Graeb	3	308	0	2	5	489
Ira O. Biffle	39	4,194	0	12	51	8,753
Lowell S. Harding	6	654	0	0	6	654
E. Hamilton Lee	61	7,758	2	2	65	8,121
Chas. E. Bradley	26	3,924	2	1	29	4,172
Wm. W. Harrison	1	90	0	0	1	90

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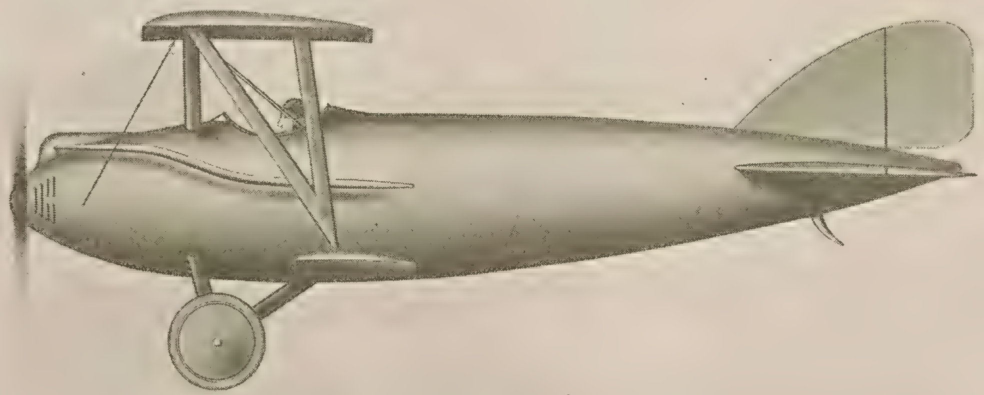

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LOUGHEAD AIRCRAFT MANUFACTURING COMPANY

SANTA BARBARA, CALIFORNIA

Contractors to the U. S. Navy

N C Fliers Visit Paris and London

(*Continued from page* 4)

"This is a real American welcome," said Lieutenant Commander Read. "I thank you." He then managed to drop into the crowd.

Besides several hundred members of the A. E. F., many Australian, New Zealand and British soldiers and officers joined in the welcome, but the size of the crowd was insignificant compared to the cheering mass that greeted Hawker. The American doughboys, however, made up in enthusiasm what the crowd lacked in size, and dragged the touring car containing the crew of the NC-4 to the Aero Club, where an impromptu reception was held.

Mr. and Mrs. Hawker were on the station platform, but the Australian flier's wife was unable to get through the press of humanity to greet the Americans. Until the Americans had left the station Clifford Prodgeer, a British airman, did fancy flying stunts over the crowd.

Although British officials here, particularly those of the Royal Air Force, are desirous of showing appreciation of the Americans' great feat, the public shows apathy toward the whole affair.

Lieutenant Commander Read and the other naval airmen, accompanied by Rear Admiral Plunkett and his staff, had a rousing welcome from the crowd at the Hendon Airdrome. Hawker had arrived in advance of the party and was in the air doing a "stunt" when the Americans arrived.

Later the Americans and Mr. and Mrs. Hawker were driven round the airdrome in automobiles. The party was received with vociferous cheering and flag waving.

Congressional Action

A resolution tendering the thanks of Congress for the commanders and crews of the NC seaplanes which were engaged in the transatlantic flight was introduced in the House on May 31 by Representative Hicks (N. Y.), chairman of the Subcommittee on Naval Aviation.

Mr. Hicks also introduced a bill authorizing the President to appoint Lieutenant-Commander Read and Commander Towers as commanders in the permanent establishment of the Navy, and Lieutenant-Commander Patrick N. L. Bellinger as a Lieutenant-Commander. The men now hold temporary rank.

The resolution introduced by Mr. Hicks follows:

"Resolved, That whereas due to the skill of American engineers the genius of American mechanics and the bravery of American officers communication between the New World and the Old has been established by the navigation of the air in the flight of a navy seaplane between Newfoundland and Portugal; and whereas this signal achievement—the first in history—has brought fame to the country, prestige to the service and honor to those associated in the daring enterprise the thanks of Congress be and the same hereby are extended to Lieutenant-Commander Albert C. Read, U. S. N., and Lieutenants Elmer F. Stone, C. G.; James L. Breese, U. S. N., and Walter H. Hinton, U. S. N.; Chief Machinist's Mate E. S. Rhodes, U. S. N.; Chief Special Machinist E. H. Howard, U. S. N.; Commanders John H. Towers and Holden C. Richardson, U. S. N.; Lieutenant-Commander Robert A. Lavender, U. S. N.; Lieut. David H. McCullough, U. S. N.; Machinist Lloyd R. Moore, U. S. N.; Lieutenant-Commander Richard E. Byrd, U. S. N.; Lieut. Braxton B. Rhodes, U. S. N.; Lieutenant-Commanders Patrick N. L. Bellinger and Marc A. Mitscher, U. S. N.; Lieuts. Louis T. Barin and Henry Sadenwater, U. S. N., and Machinist Rasmus Christensen, U. S. N.

"And that as a further appreciation the President is hereby authorized to present in the names of Congress a medal of honor to Albert C. Read, U. S. N.; John H. Towers, U. S. N., and Patrick N. L. Bellinger, U. S. N."

Hawker's Remarks

Speaking at a luncheon in London on May 28 in his and Lieut. Commander Grieve's honor, Harry G. Hawker depreciated the organization which had won for the United States the honor of the first crossing the Atlantic by a heavier than air machine. He said that it was not a serious attempt, with a ship stationed at "every twenty yards."

Hawker continued: "If you put a ship every fifty miles it shows you have no fight in your motor."

This was greeted with absolute silence on the part of the men gathered at the luncheon, numbering between 250 and 300, nearly all of whom were British. A few minutes before they had cheered heartily the statement that the American Navy aviators had been successful in reaching Europe.

Capt. Charles P. Morgan, who was to have been navigating officer of the Martinsyde but was badly hurt when Raynham's machine crashed in an attempted take-off at St. Johns, was credited with expressing much the same opinion some weeks ago.

A day or two later Hawker said: "The Americans misunderstood my point. I was not criticising their attempt. It is impossible to compare the two flights. We did not wish to have battle ships supplied by the government along the route.

"My remarks were intended for those who were criticising the government for not supplying them. I wish the Americans the very best of luck. Their flights have been beautifully organized jobs from beginning to end.

"I am very sorry indeed that the American press has misunderstood me. Nothing was farther from my mind than to criticise the Americans."

Honorable Discharges

The following officers are honorably discharged from the Service of the United States:

Frank S. Welsh, Second Lieutenant, A. S. A.
Edward J. Nolan, First Lieutenant, A. S. A.
John H. Snyder, First Lieutenant, A. S. A.
George E. Ramey, First Lieutenant, A. S. A.
Roger D. Acker, Second Lieutenant, A. S. A.
Carl H. Butman, Second Lieutenant, A. S. A.

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First Plane Over Bermuda

Whatever success Professor David Todd of Amherst may have in observing the eclipse of the sun from an airplane May 29, and as yet it is not known whether he reached the zone of observation in time, his trip made thousands of the population of Bermuda happy, for while the steamship Elinor, upon which he was traveling, was at the port of St. George making repairs the Navy airplane gave the Governor, General Sir James Willcocks, the first bird's-eye view ever obtained of his domain and delighted the Bermudians with a sight of the first aircraft ever to fly over their island. It was pointed out that it would be appropriate for the Governor to make the initial ascent, as his official title designates him as Governor "of and over" the Somers Isles. There are 365 of these islands, and the Governor had full opportunity to make a full survey of his domain.

Hawker's Plane Saved

The Sopwith biplane in which Harry Hawker and McKenzie Grieve attempted to fly across the Atlantic was picked up in latitude 49.40 north, longitude 29.08 west, by the American ship Lake Charlottesville.

Captain Elverson wired that he had taken aboard parts of the plane and all of the mail it carried and was proceeding to Falmouth, England.

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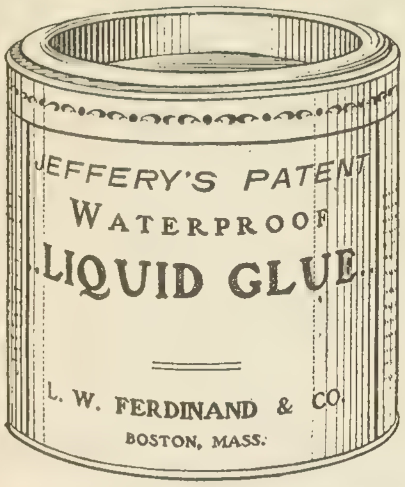

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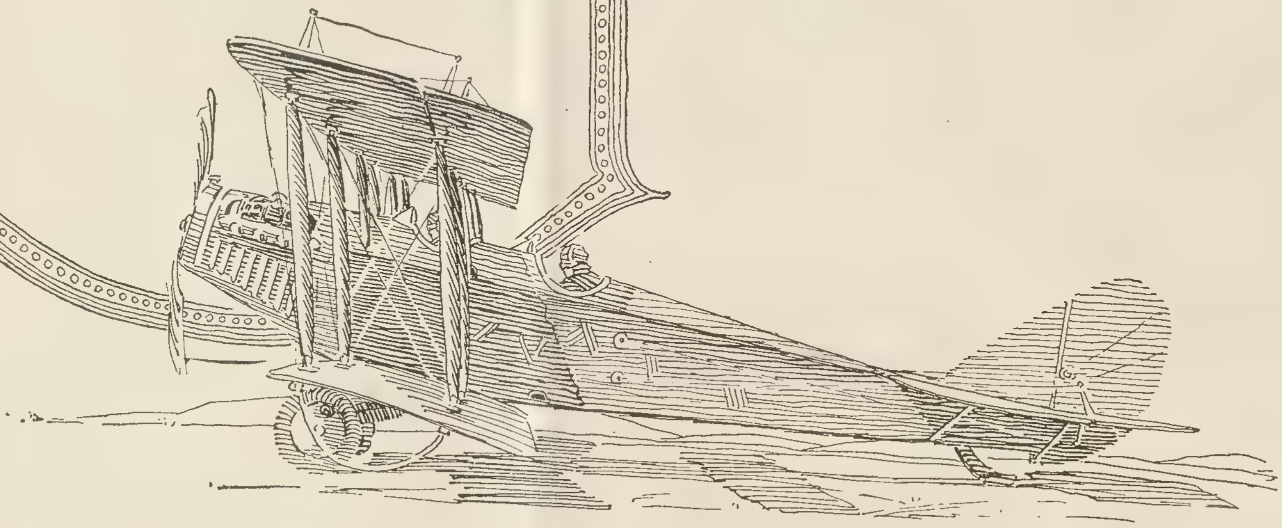

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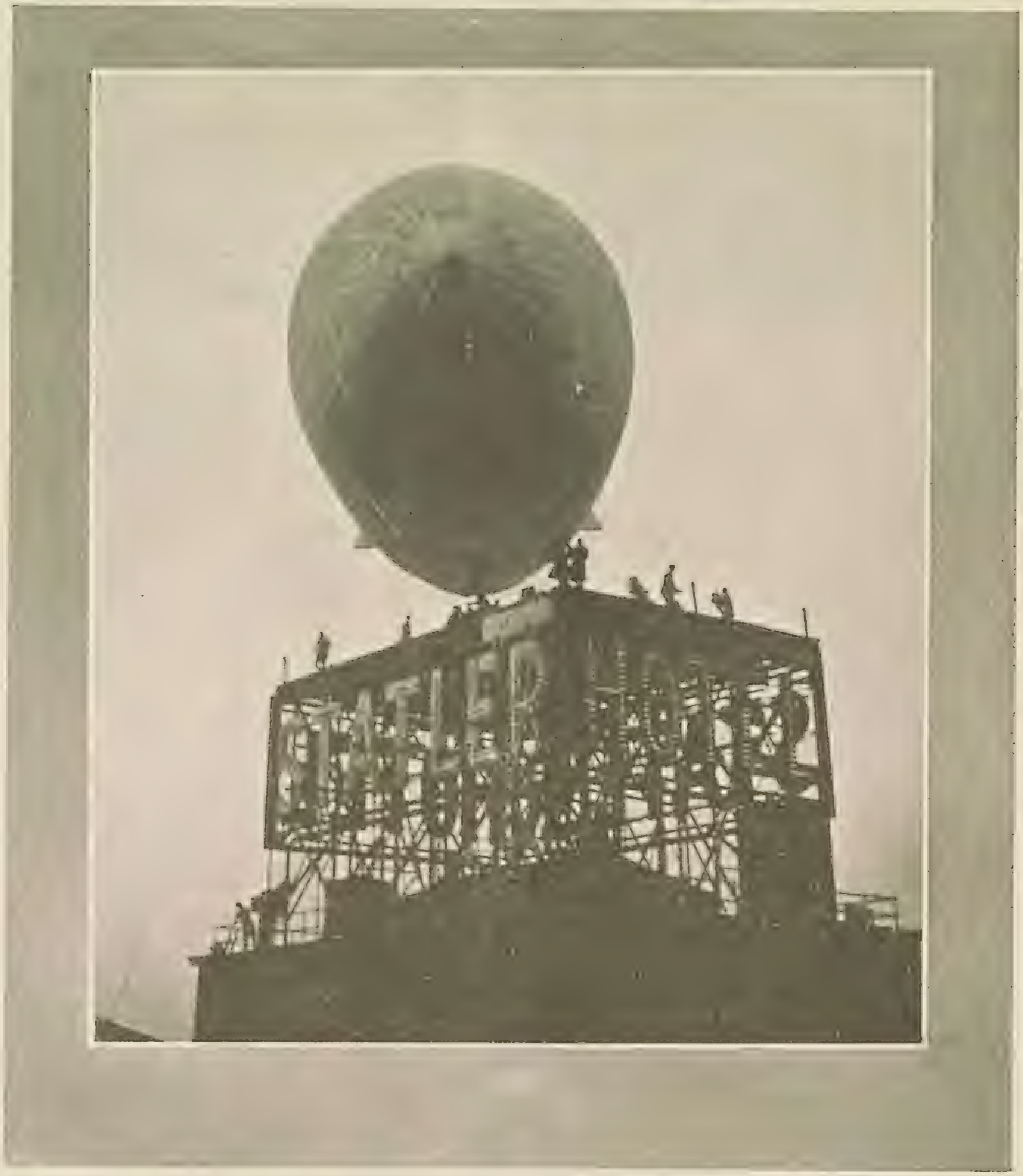
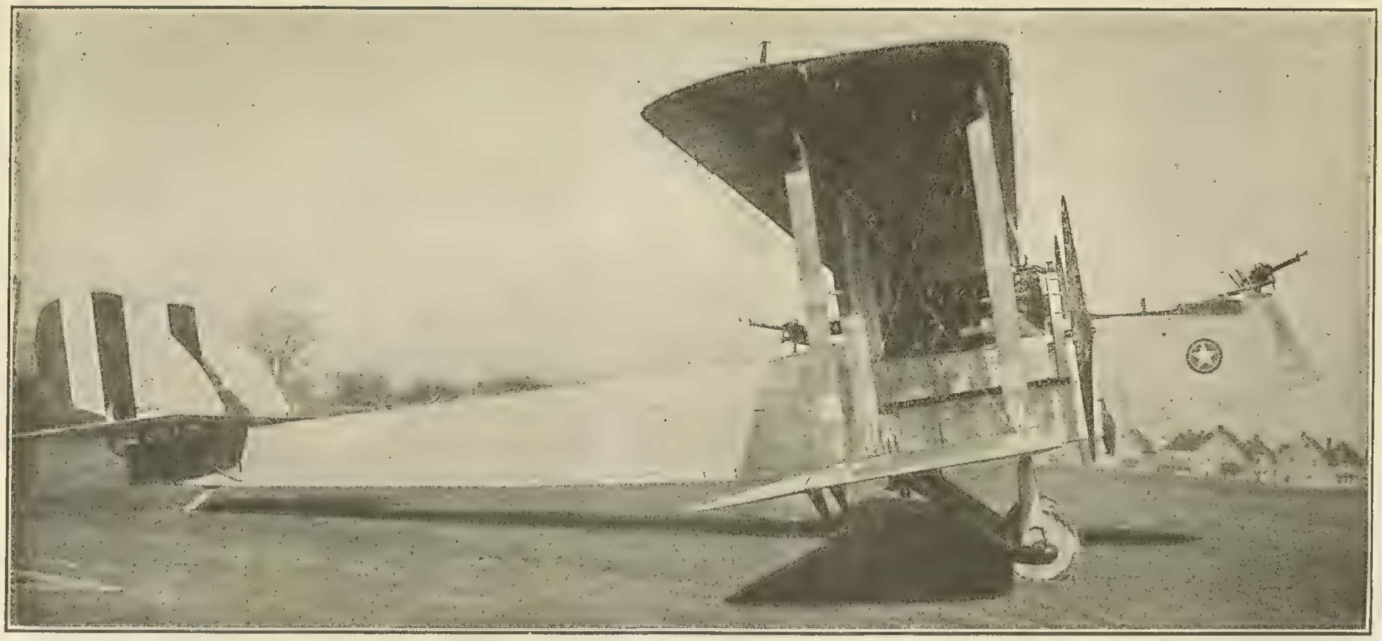


Photo Goodyear Tire & Rubber Co.

Army Dirigible A-4 Landing on the Roof of the Statler Hotel, Cleveland, Ohio



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Contractors to the United States Government

Congress and the Air Services

Details of the Army and Navy Money Needs and the Importance of Quick Action

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Unless some radical change comes over Congress regarding the Air Service appropriations, this country will find itself without aircraft capable of fighting in the air against even unimportant nations that have secured the latest types of European airplanes. While American constructors have produced and are prepared to make airplanes which are superior to any flying to-day, Congress is making the ordering of these types impossible by cutting appropriations to a point where the services can only mark time and watch our oversea rivals outstrip them.

What the Army Asks

That the Army and Navy are fully alive to the dangers of the situation is shown in the carefully prepared estimates which were presented last week.

The request of the Army in detail was as follows:

AIR SERVICE ESTIMATES
ARMY APPROPRIATION BILL 1920

Training Candidates for Commission		$1,035,985
Training Enlisted Mechanics		1,809,500
Aerial Photography		345,000
Supplies and Expenses for Operation of Balloon Schools		17,250
Maintenance of Buildings and Grounds at Aviation Stations, Supply and Repair Depots; Lease of Land and Buildings		6,249,195
Operation of Supply Depots, etc.		2,631,630
Experimental Investigation and Development of Aircraft		12,663,380
Helium Gas		
Acquiring Rights	$500,000	
Development of Rights	500,000	
Operation of Plants	596,000	1,596,000
Purchase of Balloons and Airships		4,694,000
Purchase and Production of Hydrogen		366,750
Repair and Replacement of Dirigibles		450,000
Sixteen (16) Canvas Balloon Hangars		100,000
Balloon Instruments and Accessories		100,000
Airship Stations		6,710,000
Airplanes and Motors		31,827,720
Airplane Spare Parts		250,000
Engine and Plane Maintenance		1,176,000
Special Aviators' Clothing and Equipment		200,000
Damages Produced by Aircraft		150,000
Medical Research and Apparatus		79,400
Air Service Project, Insular		750,000
Pay and Mileage for Reserve Officers Ordered to Active Duty for Instruction		100,000
Special Projects:		
Langley Field, continuation of construction	$1,250,000	
Rockwell Field, continuation of construction	1,250,000	
Dayton Wright Project	3,260,000	
Ream Field	470,200	
Curtiss Elmwood Plant	980,615	
Pacific Coast General Supply Depot	1,500,000	
Rental of Fields for Storage.	100,000	8,810,815
Actual Traveling Expenses of Officers, Civilians, and Enlisted Men on Special Duty at Home and Abroad; Pay of Civilian Employees, and for Other Purposes		1,059,090
Total		$83,171,715

While some of the projects requested are debatable and can be properly taken up in separate bills, there is no reasonable argument for delaying putting into production airplanes and lighter-than-air equipment so that the Army Air Service can commence forming combat squadrons for pursuit, bombing and observation.

Naval Needs

The Navy has submitted its appropriation request in greater detail than the Army. In a condensed form it follows:

NAVY AVIATION PROGRAM FOR 1920. APPROPRIATIONS BASED ON RECOMMENDATION OF GENERAL BOARD.

A. Provide necessary aircraft and equipment for Fleet use.

PLATFORMS.		
Flying off—87 turrets—$3500 per turret.		$304,500
Flying on— 1 turret—experimental		3,500
PLANES.		
Loening, $15,000 without motor—$5000 Hispano-Suiza motor—complete unit, $20,000—54 units		1,080,000
Camel—Single seater. Used plane from the Army, $10,000. New, complete, $20,000 per unit—55 units		1,100,000
Martin Bomber, complete—$40,000 per unit—20 units		800,000
SPARE MOTORS.		
Hispano-Suiza, $5000 per unit—89 units.		$445,000
MOTOR SPARES—(to care for 238 motors)		60,000
PLANE SPARES—(to care for 129 planes)		447,000
SPARE Navigation and Gunnery Equipment		79,750
PORTABLE HANGARS—$600 per plane—129 units		77,400
Expendible Small Stores		52,000
SPARE PROPELLERS.		
2 bladed—$125 per unit—327 units		40,875
4 bladed— 250 per unit— 60 units		15,000
Total		$4,505,025

B. To purchase from England ten of the latest type ship planes (Parnell Panther type).

Planes—$20,000 per unit, complete—10 units	$200,000	
Total		$200,000
C. To erect large hangar at Cape May to house dirigible received from abroad (dimensions, 660x250x160), and to increase the gas plant	$1,850,000	
Total		1,850,000
D. To establish a rigid dirigible construction and operating station	$6,264,000	
Total		6,264,000
E. To construct two rigid airships, each of 2,000,000 cu. ft. capacity. Estimated cost at $1 per cu. ft.	$4,000,000	
Total		4,000,000
F. To contract for one rigid dirigible in England or Scotland, to be constructed there and delivered to us	$2,500,000	
Total		2,500,000
G. To authorize the construction of one airplane carrier	$500,000	
Total		500,000
H. To convert two merchant vessels into aircraft tenders, one for heavier-than-air and one for lighter-than-air craft C & R		4,700,000
Total		$20,014,000

I. To continue in operation on a peace basis all air stations already established.

(1) To provide planes for training operations, 90 planes, types as follows:

Single seaters — 54 — at $10,000 per unit, complete	$540,000	
Plane spares	60,000	
Motor spares	20,000	
15 Loening's at $20,000 per unit, complete	300,000	
Plane spares	60,000	
Motor spares	7,000	
30 D.H.9's at $15,000 per unit, complete	450,000	
Plane spares	60,000	
Motor spares	15,000	
6 Martin Bombers at $40,000 per unit, complete.	240,000	
Plane spares	36,000	
Motor spares	6,000	
Total		$1,779,500

(2) To complete authorized construction as follows:

4 -NC Flying Boats with spares and handling gear	$500,000	
4 -TF Flying Boats, with spares and handling gear	200,000	
50 -MF Flying Boats	300,000	
Completion of F-5 Flying Boats (about 35) for which parts have already been paid for out of 1919 money	250,000	
Total		$1,250,000

(3) Maintenance of stations—(excluding pay of officers and men and rations of men) as follows:

Chatham	99,240	
Montauk	68,340	
Rockaway	170,220	
Cape May	102,080	
Anacostia	92,520	
Hampton Roads	237,020	
Miami	19,360	
Key West	144,920	
Pensacola	615,427	
San Diego	193,400	
Coco Solo	132,880	
Akron	54,080	
Marginal Parkway	31,040	
Brunswick	49,540	
Morehead City	39,640	
Fleet Air Field	28,960	
Fleet Air Base (Langley Field)	$136,960	
Great Lakes	100,000	
Aircraft Factory	854,500	
Miscellaneous Detail	26,280	
Paris Island, S. C.	63,840	
Quantico, Va.	53,840	
Haiti	23,280	
Santo Domingo	27,560	
Dutch Flats, San Diego	26,080	
Helium Plant		$281,250
Total		$3,672,251

(4) For purchase of land:

Chatham	$45,250	
Montauk	27,300	
Rockaway	785,000	
Brunswick	224,750	
Key West	295,300	
Galveston	15,000	
Total		1,392,600
Grand Total		$7,813,107

Note.—Purchase of stations as follows not included: Miami, Fla. (not desired); Morehead City, N. C. (State land); Marginal Parkway, N. Y. (State land); Bay Shore, L. I. (not desired); San Diego (Presidential proclamation, 7/27/17, believed to be Government property).

J. Continue experiment and development work on a liberal scale for all types of heavier-than-air and lighter-than-air craft.

(1) Experimental Station, heavier-than-air		$2,705,000
(2 To carry on the development in, and experiment with heavier-than-air and lighter-than-air craft. Equipment, etc., as follows:		
(a) Aircraft H/A—Experimental types — cost without engines	$3,000,000	
(b) Engines for H/A craft, experimental — total cost	500,000	
(c) Engines for L/A craft, experimental — total cost	200,000	
(d) Experimental work, L/A, miscellaneous and not enumerated in the above items—total cost	3,000,000	
		6,700,000
Total		$9,405,000

Note.—Item (a). With regard to experimental types of H/A, it is the intention to investigate the possibility of building larger flying boats than the NC class, which has successfully made a trans-atlantic flight. It is also essential that the types to be used with the Fleet be developed. The ability to fly off turrets has been proved, and a serious problem at the present time is the recovery of planes of this class which are light and up to the present have not been fitted with pontoons or boat hulls.

The development of torpedo planes and heavy and light bomb carriers, as well as machines for reconnaissance work and scouting, is essential, and the progressive development of these types is being carried on abroad.

Item (d).

(a) Development and construction of large non-rigid dirigibles (unit).	$250,000
(b) Development and construction of medium sized non-rigid dirigibles (unit)	100,000
(c) Development and construction of small non-rigid dirigibles (for towing) (unit)	75,000
(d) Development and construction of 12 large kite balloons	125,000

Experimental work and design must be conducted with the idea of developing the uses of dirigibles in mine sweeping, surveying and sea scouting. The ability to tow a dirigible and to decide the usefulness of this type in lieu of the kite balloon requires exhaustive investigation. The construction of a machine that can be moored out and a plan for mooring out are requisites.

HEAVIER-THAN-AIR.

K. Purchase or obtain from Army for Marine Corps, Aviation Section, aircraft as follows:

45 Voughts—VE 7 Hispano Suiza 150 hp.				
Cost of Plane	$12,000	$540,000		
Cost of Motor	4,200	189,000		
	$16,200	$729,000	$729,000	
Plane spares.	108,000			
Motor spares.	18,900			
	$126,900		126,900	
Total				$855,900
40 Loening Monoplanes Hispano Suiza 300 hp.				
Cost of Plane	$15,000	$600,000		
Cost of Motor	5,000	200,000		
	$20,000	$800,000	$800,000	
Plane spares.	120,000			
Motor spares.	20,000			
	$140,000		140,000	
Total				$940,000

(*Continued on page 14*)

Attitude of the Navy Toward a United Air Service

"Naval Aviation Must Be Conducted by the Navy and Not by Any Third Branch of the Service"

By Franklin D. Roosevelt
Assistant Secretary of the Navy

There has been considerable discussion of late with regard to the advisability of establishing a United Air Service in this country along the line of that adopted during the war by Great Britain.

It is not clear exactly what those advocating the united service have in mind when making their contentions. Is it a united service for the Army and the Navy only, or is it a service which will unite all governmental activities in the air, including those of the Post Office, the Treasury Department, as well as of the War and Navy Departments, and is it the intention that such a service shall control or would control commercial and industrial activities in the air? A moment's thought will reveal the complications which are involved and a very brief study makes it evident that a united air service in any form would seem impossible in the United States at the present time.

Unity of Command Essential

Let us first consider the unification of the Army and the Navy for the purpose of carrying on aviation activities. It has long been recognized that the successful naval or military commander is the one who is most adept in the combined use of his weapons and who possesses strong and mobile units which he is able to place where he needs them at the time at which he desires to utilize their united power. Real strength is imparted through the ability to coordinate the work of all of the mighty forces which now constitute military strength. In order to coordinate properly, it is necessary that the different branches thoroughly understand not only their own work but also the work of those with whom their efforts are joined. The artillery of today we see merging closely with the infantry. The grenadier has come to his own again and works with or opposes the machine gunner. The captive balloon, perhaps now our most primitive form of aircraft, has become definitely accepted as a necessary part of an Army command. Unity of command is an essential if success is to crown a combined effort. The aerial scouts and patrols covering the front of the Army must be under Army control in just the same degree as are the aircraft utilized for the control of gun fire.

In order to have adequate control in time of war, it is necessary that there should be the same unity of command in time of peace and during the period of preparation for war. In other words, military aviation must be under the Army at all times for the purposes of training and operation.

Naval Aviation

The same arguments which have been advanced for the control of its own aviation on the part of the Army would seem to be even stronger in so far as the Navy and its Aviation arms are concerned. Naval Aviation today is planned with the idea of furthering the efforts of surface borne vessels or of those operating under the surface. It would seem probable that a great Fleet action of the future would be preceded by a determined effort of one side to obtain a mastery of the air which would permit a determination of the dispositions of the enemy, and by observation from high in the heavens the securing of data for spotting purposes. Aviation furnishes a counter to the smoke screen. The aviator flying from a turret or deck of a naval ship must be of the Navy. He must be a member of the large family which the Naval service likes to consider itself. He can have no other status than that of a seaman trained with other Naval men and familiar with Naval methods and with sea life.

The reasons advanced above are based, of course, on the successful employment of arms as they are utilized at present and as such they are irrefutable. It has been stated that in time of peace, strong arguments for a united service, in so far as the Army and the Navy are concerned, would be from the viewpoint of the production of aircraft. Here again it would seem that a fallacy existed. The production of aircraft for the purposes of the Army and the Navy should not be very great in the days to come in the near future. Our effort during the years in which we hope peace is to prevail, will be in the direction of a progressive and intensive development. This means that the study for improvement of aircraft should be approached from several points and under the direction of many individuals rather than from one direction or under the guidance of a single mind or organization. In other words, we do not care to standardize —meaning stand still—too extensively. It is our wish rather that the problem of securing greater safety and better and more powerful machines should be widely studied. Hence, a good reason for keeping the governmental military branches of Aviation separate.

Other Government Air Activities

With regard to the unification of the Post Office, Treasury and other Departments of the Government for the purpose of peaceful employment but little can be said adversely from a naval and military standpoint. It is probably to the best interest of Aviation to have each Department control its own air activities. From the point of view of governmental economy, the unification of these Departments and the distribution of their duties between the Army and Navy may be advantageous.

It is not believed that in this country the civilian would submit himself in the future to governmental control in the air in time of peace any more readily than he does now on the surface of the land or water. Today we see civil organizations aiming to assert themselves as controlling influences in aviation matters. There can be no objection to the activities of such organizations. In fact there are reasons why the Government should foster and encourage such societies, but naturally an obligation is implied that these societies should in turn lend a helping hand in a military way to the Aviation organization of the Government. In England the Aero Club has a very definite and official status. In this country, it is believed that our civil organizations for the promotion of Aviation when legitimate should be closely associated together and with the government by every proper means.

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Arguments for a United Service

The strongest arguments advanced for a united air service, it is believed, are suggested by those who seek high position and rank, together with the emoluments which accompany authority in the formations of a new departmental activity. It may be that arguments by persons of this character were very powerful and contributed materially toward the establishment of a united air service in England, where, however, the methods for handling all military affairs are quite widely different from those employed in the United States. England seeks absolute supremacy in the air today as she has sought it and enjoyed it unchallenged for hundreds of years on the surface of the sea. Even so, however, it is believed that now there is a feeling in Great Britain that the unification of the air service of the Army and the Navy was a mistake and the tendency is noticeable toward a separation. It is of interest to note that the lighter-than-air branch of British Aviation has always remained under the control of the British Admiralty.

When military effort exercised in the air becomes supreme and ships and men operating on the surface of the water or on land are subsidiary, then the time will have arrived for a United Military Air Service.

Room for Different Opinions

The important point in all of this Naval Aviation work is that it is essentially different in character from land operations. There is, at the present time, an agreement between the War Department and the Navy Department under which the general line of demarkation between the services is at the coast itself. In other words, flying over land belongs to the Army and flying over water belongs to the Navy. I very much hope that this distinction will be recognized, not as an arbitrary one, but as one which is based on fundamental conditions in the development of the general science of aviation. Aviation in the air is based for war purposes on exactly the same principles of actual operation as other branches of war. Naval operations have always been separated from Army operations, and their very character requires a very different education and preparation.

There has been of late much discussion about forming a third branch of the armed forces. I do not attempt to speak in any way for land operations, but I do feel that I can speak in behalf of the consensus of opinion among Naval officers when I say that the operating part of Naval Aviation in conjunction with Naval operations must be conducted by the Navy, and not by any third branch of the service. There is, perhaps, room for a difference of opinion on the question of actual manufacture of the equipment, but matters of development, as well as matters of conducting the Naval part of the war itself, must be so closely affiliated with the Navy as a whole that no separation should be permitted. Every step taken in this war proves the strength of this position. There should be, of course, the most whole-hearted cooperation and interchange of ideas between the air service over land and over water, but the Navy expects and will do everything possible to retain its own aviation forces.

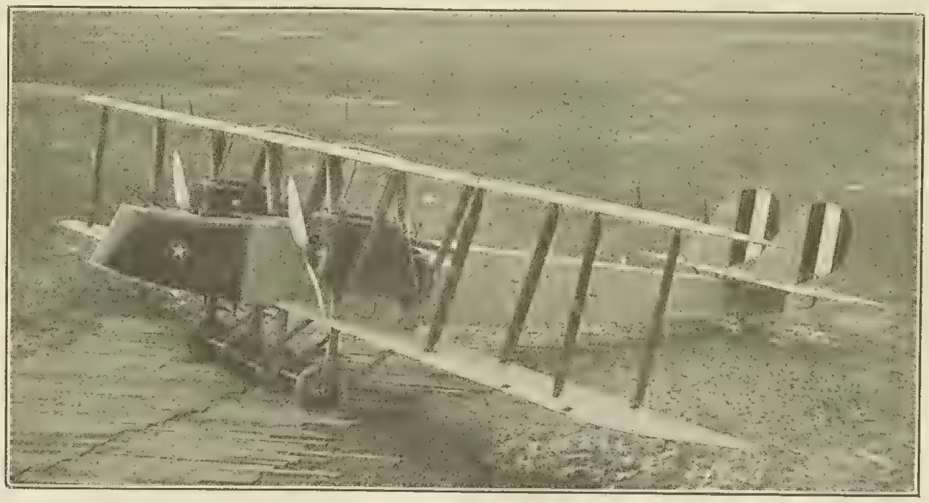
Martin Bomber's Coast to Coast Trip Next Week

Capt. Roy N. Francis Expects to Make the 2750 Miles in 31 Hours and 4 Mins. with One Stop

The Martin bomber, with which Capt. Roy N. Francis, U. S. A., will attempt a one-stop flight across the continent from New York to San Francisco, will probably start the 2,750 mile flight from coast to coast next Monday.

This statement was made by Glenn L. Martin, pioneer designer and manufacturer of the machine which is expected to make over land a record no whit less distinguished than that of the navy seaplanes on their Atlantic flight. Mr. Martin has come to New York to lend what aid he can in preparing for the flight of Capt. Francis and his crew, and will be here until after the trip is started.

On the double page map printed elsewhere in this issue of AIRCRAFT JOURNAL are shown all the aerial routes of the United States as reported to the Director of Air Service, Gen. Charles T. Menoher—including the route to be followed by Captain Francis on the transcontinental flight.



Type of Martin Bomber which will start on a Transcontinental Flight next week

Flies Without a Hitch

The bomber had its maiden flight Saturday at Cleveland, where it was made. It took the air at 5:30 o'clock, piloted by Erie Springer of the Martin Company. Capt. Francis went along as a passenger. It worked properly, according to reports Mr. Martin has received. The two Liberty Twelves which form its power plant will have their tuning up in the Cleveland-Dayton and Dayton-New York flights, and there will remain after arrival here only the adjustments before the take-off.

The transcontinental bomber differs only in details from six Martin bombers previously delivered to the Army, said Mr. Martin. She carries none of the armament of the military planes and has been equipped with a larger gasoline tank, bringing the fuel supply for the trip up to 650 gallons.

Her Load 10,600 Pounds

The bomber weighs light, 5,800 pounds, a little more than one-third as much as the navy's NC flying boats. Her military load is 9,600 pounds, and the extreme load she is expected to carry when she takes off at Hazelhurst Field for the longest non-stop flight yet made will be 10,600 pounds. In addition to Capt. Francis and Lieut. Edward A. Clune, her pilots, she will carry one mechanician and about 400 pounds of oil.

Arrangements for the comfort of the crew en route are superior to those generally provided for long flights. Back of the gasoline tank is a compartment with toilet facilities. There are also lockers for food and clothing. A lavatory is also provided. On the flight from Mineola, which will begin at 3:30 A. M., the plane will gain three hours of daylight because it is flying into the sunset. It is hoped to reach North Platte at 8.05 P. M.

On arriving at the Coast it is Capt. Francis's purpose to turn north and return east by a different route which has not yet been announced.

"The trip will demonstrate the practicability of a commercial airplane service between New York and San Francisco," said Mr. Martin. "It will show that passengers may leave New York at 3 o'clock in the afternoon and after thirty hours of continuous flying, with relays of airplanes, reach San Francisco at 9 o'clock on the following evening.

"To put such a business on a substantial basis it will be necessary to have air divisions laid out, after the fashion of railroad divisions, with proper terminals and terminal facilities, airplane despatchers and the other features of an efficient service. The railroad division is generally about 300 miles, when engines and crews are changed. The airplane divisions might be from 500 to 800 miles, depending upon what experience reveals as to economy and efficiency of operation.

"The war has developed airplane performance, but it has not educated the people to the necessity of systematic handling of airplane routes and the provision of the necessities therefore. Development of the wireless compass in the last few months has been a wonderful thing for air navigation. We shall have ready soon a wireless compass which will give the flyer his course visually instead of by the audible reaction, as was the case with the direction finders used on the navy's transatlantic seaplanes.

Commercial Aviation Here

"Commercial aviation is already here.

"In the freight carrying field, the Queens Mines, Inc., of Nelson, B. C., are negotiating for one or more airplanes to operate between their Nugget Mine, on top of a mountain and the coast, fifteen miles away. To build a road to the mine would cost, it is estimated, $2,000,000. A landing field can be built behind the mine on the mountain top and a plane could transport a load of gold concentrates to the coast in twenty minutes. If the plan goes through, the five stamping mills the company wants to install will be carried in by plane, and the machine will also freight to the mountain top the cement needed for the landing field.

"The Netherlands East Indian Government is talking of purchasing twenty Martin bombers for operation between Java and the other islands it owns in the Far East. It calculates that it can use them not only for commercial work, but, if need arose, for military purposes in a land where revolts sometimes arise quickly."

Flight Time Schedule*

Showing Cities and Towns on "Line of Flight" and Approximate Flight Time of the U. S. Martin Bomber.

Towns	Local Time A.M.
Lv. Mineola	3:30
New York City	3:37
NEW JERSEY	
Jersey City	3:40
Newark	3:45
West Orange	3:48
Madison	3:54
Morristown	3:57
German Valley	4:07
Port Murry	4:13
Oxford	4:16
Belvidere	4:19
PENNSYLVANIA	
Leighton	4:43
Mauch Chunk	4:46
Delano	4:56
Brandonville	4:59
Paxinos	5:20
Sunbury	5:27
Millmont	5:41
Coburn	5:55
Bellefonte	6:05
Phillipsburg	6:19
Mitchells	6:29
Clearfield	6:36
Grampian	6:45
Redbank	7:14
East Brady	7:17
Euclid	7:30
New Castle	7:47
OHIO	
Youngstown	6:57
Niles	7:03
Braceville	7:11
Garretsville	7:18
Cleveland	7:42
Lorain	7:59
Vermilion	8:09
Sandusky	8:22
Port Clinton	8:33
Oak Harbor	8:41
Toledo	8:55
Wauseon	9:17
INDIANA	
Butler	9:44
Auburn	9:53
Albion	10:07
Milford	10:22
Plymouth	10:39
Walkarton	10:50
Union Mills	11:00
Valparaiso	11:11
Gary	11:25
ILLINOIS	
Chicago	11:42
Wheaton	11:58
	P.M.
Geneva	12:07
Sycamore	12:21
Rochelle	12:35
Dixon	12:50
Sterling	1:00
Denrock	1:11
Rapids City	1:24
Rock Island	1:37
IOWA	
Davenport	1:39
Muxcatine	1:57
Nicholas	2:06
Iowa Junction	2:17
Webster	2:39
Thornburg	2:45
Montezuma	2:54
Lynnville Junction	3:05
Monroe	3:15
Newton	3:23
Prairie City	3:31
Des Moines	3:45
Van Meter	3:56
Menlo	4:13
Atlantic	4:36
Oakland	4:50
Council Bluffs	5:08
NEBRASKA	
Omaha	5:11
Wahoo	5:34
Brainard	5:46
David City	5:52
Osceola	6:08
Central City	6:26
St. Paul	6:44
Loup City	7:04
Mason City	7:17
Oconto	7:34
Arrive North Platte	8:09
	A.M.
Leave North Platte	3:30
Ogallala	4:05
COLORADO	
Julesburg	4:29
NEBRASKA	
Chappell	4:39
Sidney	4:57
Potter	5:10
Kimball	5:24
WYOMING	
Pinebluff	5:42
Cheyenne	6:07
Laramie	6:37
Walcott	7:27
Rawlins	7:41
Wamsutter	8:09
Thayer Junction	8:44
Rock Springs	8:57
Green River	9:07
Granger	9:27
Carter	9:47
Evanston	10:09
UTAH	
Castle Rock	10:17
Echo City	10:30
Coalville	10:34
Salt Lake City	10:55
Ogden	—
Garfield	11:03
NEVADA	
Shafter	11:31
Secret	11:59
	P.M.
Elko	12:20
Carlin	12:34
Palisade	12:40
Battle Mt.	1:08
Iron Point	1:28
Winnimucca	1:43
Mill City	2:01
Orena	2:22
Hazen	3:08
Sparks	3:33
Reno	3:37
CALIFORNIA	
Truckee	3:55
Emigrant Gap	4:13
Colfax	4:31
Auburn	4:43
Sacramento	5:04
Davis	5:12
Suisun	5:25
Oakland	5:55
Arr. San Francisco	5:58

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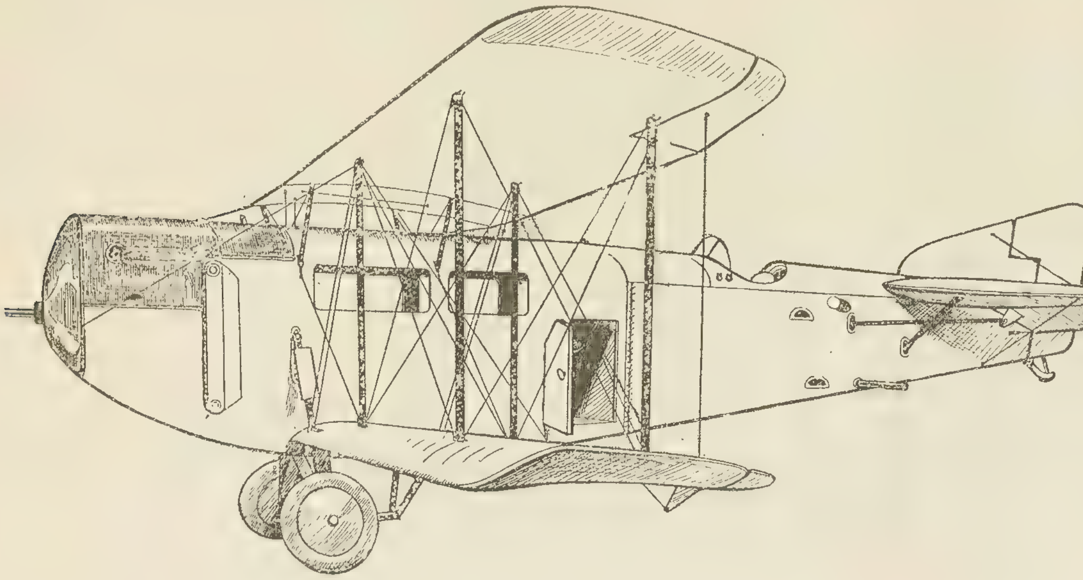
* This Time Schedule Is Subject to Variation Dependent Upon Wind Conditions.

Notes on Technical Aeronautics

A Passenger Four-Seater Biplane

In a recent English design, the B. A. T. Four-Seater Biplane equipped with a Rolls-Royce 375 h.p. engine. A serious attempt has been made to provide a passenger carrying machine. The general appearance of the machine is shown in the appended cut. In the fuselage there is an engine compartment, a fuel compartment, and behind this a passenger's cabin. The latter is exceptionally roomy, measuring roughly 3 ft. in width, 8 ft. in length and just over 5 ft. in height. For passenger work, therefore, it affords great possibilities in the way of a luxuriously fitted-up and comfortable "saloon" with arm chairs, tables, etc. In the model there are three arm chairs and one folding seat, the latter being opposite the door, which is at the rear of the cabin on the port side. Windows, with sliding triplex glass are cut in the sides of the cabin between the top and middle longerons, three on the starboard and two on the port sides, whilst port holes will also be let into the turtle deck roof at various points. The pilot in the rear seat has uninterrupted vision.

The B. A. T. has a total wing area of 543 square feet, span of 46 ft., overall length of 31 ft. 4 in. and is expected to have a maximum speed of 110 m.p.h. fully loaded.



A three-quarter view of the B. A. T. four-seater biplane

Forced Landings

During the year of Post Office operations a very careful record has been kept of the mechanical causes of forced landings. These have been entirely connected with the motor. There have been a total of 37 forced landings due to motor trouble, which is one forced landing for every 3460 miles flown.

Of the motor troubles sufficient to bring down a mail plane six have been due to ignition trouble, five of the six resulting from magneto disturbance most frequently the shearing of a shaft. Disarrangement of the distributor and the failure of a generator for a Liberty engine were responsible for the other two forced landings chargeable to ignition. Work has begun in installing duplicate ignition systems for each engine, which will largely obviate forced landings from this source.

Leaking radiators or water lines are responsible for seven forced landings. It is believed that trouble from this source will be minimized by the installation of a radiator in the wing now fastened between the propellor and the engine in a position where it catches the vibrations of both the propeller and the engine.

Two forced landings resulted from valve trouble on Hispano-Suiza motors, the valves of these engines being an inherent weakness of the motor. This is a serious problem, and the Bureau of Standards has undertaken an investigation of methods to overcome it.

Failure of the gas pressure resulted in one forced landing, and this is easily remedied by the installation of an auxiliary gas tank on each plane.

Two forced landings resulted from carburetor trouble, the overcoming of which is now being studied.

There have been eight forced landings due to spark-plug fouling. This trouble can arise from several causes. It most frequently results from idling the engine in the preliminary warming-up stage before a flight. The Aerial Mail Service has urged spark-plug inventors to perfect this mechanism, and as the result of the assistance rendered one inventor has finally developed a spark plug which gives promise of entirely eliminating fouling. A set of these plugs in one bank of the low-compression Liberty engine operated 25 hours in a test ship without being withdrawn from the cylinder for the purpose of cleaning. The plugs were then withdrawn and placed in service and have functioned perfectly. An order has been placed for this type of plugs for high compression as well as low compression Liberty and Hispano-Suiza motors.

Also, there have been seven forced landings due to defects, arising during flights, in the oil-feed system. No way has as yet been discovered to overcome this trouble, which arises primarily from the fact that the distribution of oil for the lubricating of the various parts of the engine is done under air pressure. Unlike the gas feed or the ignition, it is impossible to install a dual oil system. The problem is a serious and perplexing one and is receiving constant attention.

A study of the motor troubles causing forced landings points irresistibly to the multiple engine as a solution. A multiple-power plane must be of such character that with half the power gone the remaining power will carry the aeroplane to its destination. Thus, in case of two motors, one motor should enable the pilot to continue his trip though at greatly reduced speed. In a three-motored plane it should be necessary to lose a second engine before a forced landing has to be made. In the specially constructed mail-carrying planes which the Department has outlined in bids to be opened on June 2nd, a form of construction is called for that will enable a mechanic to make important minor repairs in flight. Under these conditions it will be possible with a multiple motor to insure maintenance in the air until the objective point or terminus is reached.

The following tables are furnished for convenient reference:

EXHIBIT A

Forced Landings Due to Mechanical Troubles, May 15, 1918, to May 15. 1919.

Date.	Distributer.	Magneto.	Generator.	Radiator or water trouble.	Bad valves.	Gas Pressure leak.	Oil Pressure leak.	Carburetor.	Plugs fouling.
*May 16	..	..	..	..	..	..	..	..	1
May 20	..	1	..	..	..	..	..	..	..
June 3	1	..	..	..	..	..	..	..	..
June 8	..	..	..	1	..	..	..	..	..
June 11	..	..	..	1	..	..	..	..	..
June 24	..	1	..	..	..	..	..	..	..
July 5	..	..	..	..	..	..	..	..	1
July 8	..	..	..	..	..	..	..	..	1
July 16	..	..	..	..	..	..	1	..	..
July 23	..	..	..	..	..	1	..	..	..
Aug. 27	..	..	..	..	..	..	..	1	..
Sept. 21	..	..	..	..	1	..	..	..	..
Sept. 24	..	..	..	1	..	..	..	..	..
Oct. 26	..	..	..	..	..	..	1	..	..
Oct. 30	..	..	..	1	..	..	..	..	..
Nov.—None ...	..	..	..	..	..	..	..	..	..
Dec. 11	..	1	..	1	..	..	..	..	..
Dec. 18*	..	..	..	..	..	..	..	..	..
Dec. 19	..	..	..	..	..	..	..	..	1
Dec. 23	..	..	..	..	..	..	1	..	1
Dec. 24	..	..	..	..	..	..	..	..	1
Jan. 16	..	..	..	..	..	..	1	..	..
Feb. 8	..	..	..	1	..	..	..	..	..
Feb. 12	..	..	..	..	..	..	1	..	..
Feb. 15	..	..	1	..	..	..	1	..	..
Feb. 25	..	..	..	..	..	..	1	..	..
Feb. 27	..	..	..	..	1	..	..	..	..
Mar. 15	..	..	..	1	..	..	..	..	..
Mar. 21	..	..	..	..	..	..	..	1	..
Mar. 25	..	1	..	..	..	..	..	..	..
Mar. 27	..	..	..	..	..	..	..	..	2
Apr. 1	..	..	..	1	..	..	..	..	..
Apr. 12	..	..	..	..	..	1	..	..	..
May 2	..	1	..	..	..	..	..	..	..
Totals	..	..	..	..	..	..	..	..	..

* Thrust rod broke crank case; killed motor.

"Doehler's Topics"

"Doehler Topics" is the latest addition to the list of house organs of manufacturers interested in the aeronautical industry. It is published by the Doehler Die Casting Company of Brooklyn, large manufacturers of airplane parts.

The initial June issue contains as its feature President Doehler's address on Industrial Democracy made on the occasion of the formation of the Doehler Die Casting Employees' Association. In addition to sick benefits, life insurance, recreation, etc., the purpose of the association is to insure justice for the employees and open up a direct channel between the employees and executives for suggestions, complaints and adjustment of differences, as well as a voice and vote upon questions affecting the employees.

Recruits Given Air Rides

Aerial Ferry now running between Brooklyn and Hazelhurst field bringing in recruits after giving them a flight over New York, Lieut. Ross C. Kirkpatrick, pilot, using a Curtiss H airplane. Usual time Brooklyn to the field is twelve minutes, and flight is made at an elevation of 3,000 feet. Thus far the young recruits carried to the field by airplane have expressed no fear and thoroughly enjoyed their experience.

Glenn H. Curtiss and the NC Flying Boat

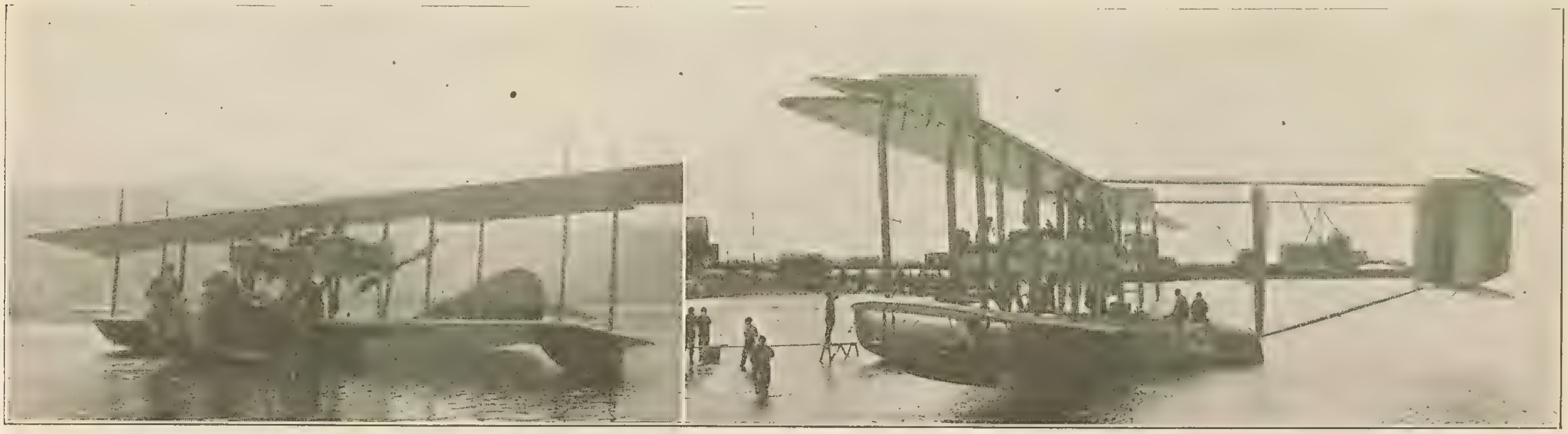
Evolution During Ten Years from the "June Bug" and the "America" to the Present Type

Marine flying, which has reached its highest point of interest in the successful attempt of the Navy-Curtis (NC) 4 to bridge the Atlantic Ocean through aerial flight, had its beginning in 1911 when Glenn H. Curtiss, who has had more to do with the development of naval aeronautics than any other living man, gave to the world a new type of airplane—a craft fitted with a float to permit it to take off from or land upon water.

Since that time, improvements have gone on steadily until the conception, development and construction of the Navy-Curtiss aerial liners.

The development of the flying boat has been a peculiarly American achievement and, in this respect, it differs somewhat from the land machine, which, although invented by an American, has been taken up and developed by Europeans as well.

In the case of the flying boat, however, there has been an almost truly American monopoly in essential progress. Size, hull lines, motor equipment, arrangement of attached surfaces have, in almost every instance, resulted from American ingenuity and American initiative. No other nation in the world is as far advanced in the development of flying water-craft as is America.



The America, built to fly the Atlantic and the NC-4, built five years later

Nine Years' Development

Just nine years have passed since the Californians were startled by the appearance of a new kind of flying machine—one that could alight on the water, cruise around and then "take off" and fly back to land. Compared by the standards of today, it was a crude craft to be sure, but no more so than Watt's first steam engine as compared with the modern locomotive. Since then, however, there has been a steady development from a thirty-foot wing spread to a machine with a span of 126 feet; from a single motor to a craft powered by four 400 hp. engines, from a carrying capacity limited to two to the memorable flight of the NC-1 carrying fifty people, from a small pontoon surface to a large, sturdy hull, strong enough to withstand the forty-eight hour buffeting of ocean waves without sinking.

Mr. Curtiss had made earlier trials with machines equipped to land upon water. As early as 1908, he had fitted up the "June Bug" with pontoons and again in 1910, when he made his memorable trip down the Hudson River from Albany to New York for the New York *World* prize, he had floats attached to the landing chassis of his machine in order to enable him to land on the water in case of necessity.

The hydroaeroplane, developed and flown at San Diego in 1910 and 1911, however, was the real beginning of flying boat development.

Flying Boat Experiments

After the hydroaeroplane came the experiments with flying boats and its convenient and compact form at once attracted world-wide attention.

The first model of flying boat to attain any great popularity was the Curtiss F boat, which was a direct result of the experiments carried on at San Diego. Soon after it came out, there were a large number of individual owners, among them Harold McCormick, of Chicago, and W. L. Judson, of Detroit, Mich. It was designed primarily as a sportsman's model. It was a "pusher" type, with a maximum speed of 65 miles an hour and capable of carrying two passengers.

At the outbreak of the European war, the F boat had been used at the water-flying schools which were operating and it adapted itself so admirably to use as a training craft that it was in demand by the allied governments as well as the United States. Many of the English and Italian naval fliers were trained in F boats as well as practically all of the earlier American navy fliers, one of the very first of them, J. H. Towers, who was placed in command of the trans-Atlantic flight.

Glenn H. Curtiss

Although the British took up water-flying, their chief interest, especially during the first part of the war, was in the development of the hydroaeroplane and it was left to the Americans to continue the development of the flying boat.

Building of the "America"

Even before this, however, the idea of a trans-Atlantic flight had been conceived. In the fall of 1913, Lieut. John C. Porte, a British naval officer temporarily retired from the Admiralty service, came to America with the idea of crossing the Atlantic. It was his intention, however, of using a hydroaeroplane with cylindrical floats.

Rodman Wanamaker, one of the earliest of America's public men to become interested in aeronautics, decided to back the undertaking and through his co-operation he made possible the building of the first trans-Atlantic flier — the "America." Glenn H. Curtiss, by this time internationally known as an inventor and designer, was consulted and asked to consider the design and construction of such a type.

The work was begun at Hammondsport, N. Y., and contact with Mr. Curtiss in working out the details of design convinced Lieut. Porte that the flying boat was more adapted to long distance flying than the hydroaeroplane and work was accordingly started upon a boat of unprecedented size and motor power.

The boat was completed and successfully flown at Lake Keuka. On the eve of shipment to Newfoundland for the trial, war was declared and Lieut. Porte was recalled to England. The "America" was later sold to the English government and did valiant service in hunting up German submarines.

Although circumstances did not permit the "America" to make the attempted flight, the successful trial flights pointed out the possibilities involved in large-size construction. It performed another mission, however, for it impressed upon Lieut. Porte the inherent advantages of the flying boat over the hydroaeroplane and, upon his return to England, opinion began to swing to the side of the flying boat. For the first time, the flying boat began to be constructed in Europe.

Lieut. Porte, as a result of his own experience, became a decided champion of the flying boat and he set before the British Admiralty its advantages and was responsible for engaging both British and American aeronautical concerns in the construction of large flying boats. The British designs were pre-

(*Continued on page 12*)

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Formerly Air Service Journal

An Air Force Required

ASSISTANT Secretary of the Navy Roosevelt presents in this issue the argument of the Navy opposing a united or independent Air Service. From the point of view of the Navy his reasoning is logical. No doubt similar arguments will be advanced by Army officials to show why the Army Air Service should remain under Army control. A good case can be made for the Air Service as a highly specialized and intensively developed branch of the Army and Navy.

But the air has developed an importance in warfare that will not allow it to remain subordinated to control which neither understands it nor has its vast interests at heart. To have as head of the Army Air Service a representative of all that the General Staff stands for in its relation to the Air Service is merely to have the Air Service a minor branch of the Army. The same applies to the Navy and its General Board. The American Air Service to become as valuable as it should in the scheme of national defense should be headed by a civilian whose first and only thought should be to develop an Air Force which will go far beyond a service. Whether or not he sits in the Cabinet is not of the greatest importance, but he should be directly responsible to the President and not under the War or Navy departments.

No greater argument for a united and independent Air Force could have been made than the duplications in the appropriations asked for by the Army and Navy. Tens of millions of dollars were allotted for experimental work involving the maintenance of large forces which, working under a single direction, could be reduced greatly. The creation of stations and flying fields were not made with any thought of co-operative effort.

General Menoher stated that the only project in which the Army and Navy were co-operating was the development of Helium; and this amounted to only a million out of one hundred and twenty-eight million dollars asked for. It is clearly apparent that the two branches of the Government will not act jointly, although such an arrangement would save the taxpayers large sums.

But the time is probably past for any compromise. Congress is bent on economy and efficiency. To accomplish this, all activities relating to aviation in connection with the Government, will be grouped under one direction and personnel and equipment allotted to the various departments. A start in the right direction has been made by Senator New, whose resolution " to report a committee to the Senate to be known as the Committee on Aeronautics, the general purpose and functions of which shall be to consider all matters appertaining to aircraft and aviation," will be acted on this month. Following this a bill will be introduced by him creating an Air Force which will take over all activities of the Army, Navy, Post Office and other Government departments. If the United States is to be an air power, some such measure will have to be adopted and the sooner the whole matter is decided the better for the aerial defense of this country.

Military Aspects of the Transcontinental Flight

A SUCCESSFUL transcontinental flight will, no doubt, provide certain information which will prove of value from the military viewpoint.

First of all it will prove a most exacting test as to the reliability and durability of the Liberty Motor. The U. S. Martin Bomber on this attempted record flight will carry a full military load—therefore, if the flight is successfully made according to schedule, it will demonstrate that under fair wind conditions a heavy type army bombing plane has a sustained cruising radius of 1,500 miles in 18 hours. The general public is aware that a bomb dropping airplane is in effect an increase of range of the artillery.

Therefore it can be proved by such a flight as this that the U. S. Army has an instrument of destruction which can play havoc with enemy troops, equipment and territory for a distance of 1,500 miles inside his border—and photograph the results.

It will also demonstrate that machines of this type can be used for long coast patrols. It further demonstrates that local disturbances where martial law has been declared can easily be checked by a fleet of these aerial giants.

Again, as time is a most important element in military engagements, it shows that military staff officers and military plans can be transported great distances in a surprisingly short time. In a word, if the performance of the machine proves what is expected and hoped, it will corroborate the faith the public has in the inventive genius of this country for this plane is in every respect a product of the brains and materials of these United States. This remarkable performance would be conclusive evidence that we have the ability to compete with the rest of the world for the supremacy of the air.

The Problem of Safe Landings

ONE of the most important problems in the commercial application of the airplane is that of safe landing.

It may be said that safe landings are already the rule, and bad landings the exception, but there is still room for the inventor and designer to work in this direction.

Lower loading per square foot is the first obvious solution. But an excessively low loading means loss in climb and speed. So that if the designer is to employ low loading, he must seek to diminish resistance by refinements of streamline.

An air brake coming into action while the machine is still in the air will certainly bring the airplane to rest more quickly, but there is the danger of sustentation being lost too rapidly with a bad shock on landing.

Devices such as increasing the wing area of the machine or the camber, while theoretically most valuable, present many structural complexities.

Air brakes applied after landing serve to decrease the distance which the airplane will roll on the ground. However, their action is not as efficient as might be expected, because the resistance of the brake goes down to a negligible small amount when the machine slows down.

Skids with claw like terminals impose severe strains on the fuselage, and while good in rolling may retard get-away.

No ideal solution seems to have been found yet, and it is hoped that work in this direction will be energetically pursued.

Next—the Pacific

THE announcement that a prize of $50,000 has been offered to the pilot making the first Trans-Pacific flight will turn all eyes Westward. May the venturesome spirit who undertakes the trip bring added fame to our pilots records.

Navy Fliers Dined and Cheered in London

Royal Air Force Cross Conferred on Commander Towers, Lieut. Commander Read and Others

Lieut. Commander A. C. Read and the crew of the NC-4, as well as Commander J. H. Towers and other American naval aviators, were guests on June 5 at a luncheon given by Major Gen. Seely, Undersecretary for Air, in the House of Commons.

The luncheon was given to discuss the future of British aviation. The Prince of Wales, Lord Birkenhead, the Lord High Chancellor, James W. Lowther, Speaker of the House of Commons; the Earl of Reading, former Ambassador to the United States; Winston Spencer Churchill, Secretary of War, and Field Marshal Sir Douglas Haig were present.

General Seely, in proposing the health of Lieut. Commander Read, who successfully flew from Newfoundland to Plymouth in the NC-4, assured him and the other Americans that "there is no trace of envy on our part for your splendid performance, and we recognize that the Americans brilliantly succeeded where we gloriously failed."

Commander Read Magnanimous

Lieut. Commander Read in responding said:

"The British people are good winners, but they are wonderful losers."

"We want to thank you for the wonderful welcome you have given us to London, and also to thank his Royal Highness for his congratulations. We are told that he is quite a flier himself, at least we judge so from the pictures in the papers.

"I am glad to see Commander Grieve here, and am sure Hawker would be here but for indisposition resulting from the great reception he has had.

"Our success was due to careful planning and preparations made. Flying across was the easiest part of the proposition.

"We feel very fortunate at having been selected for the attempt."

Referring to the warmth of Sunday's reception in London, Lieut. Commander Read said:

"If it is not presumptuous, I wish to congratulate the British people on their good sportsmanship."

It was here that Lieut. Commander Read referred to the British people as good winners but wonderful losers, the luncheon party cheering him warmly.

Capt. John Alcock, pilot, and Lieut. Arthur W. Brown, navigator of the Vickers-Vimy machine

Response by the Prince of Wales

The Prince of Wales in responding to a toast to his health, said: "I wish to congratulate heartily Commander Read and his associates, who were first to fly the Atlantic."

General Seely sketched the ambitious program for promoting aviation, including more aerodromes, with searchlights, aerial maps, and the names of places painted on the roofs of railway stations. It was stated that British lighthouses would soon be fitted to throw vertical beams to assist airmen.

In addition to members of Parliament, many prominent British airmen were present, including Major Gen. John Salmond, Director General of Aeronautics; Major Gen. Brancker, Director of the Air Organization, and Major Gen. Frederick H. Sykis, Chief of the Air Staff.

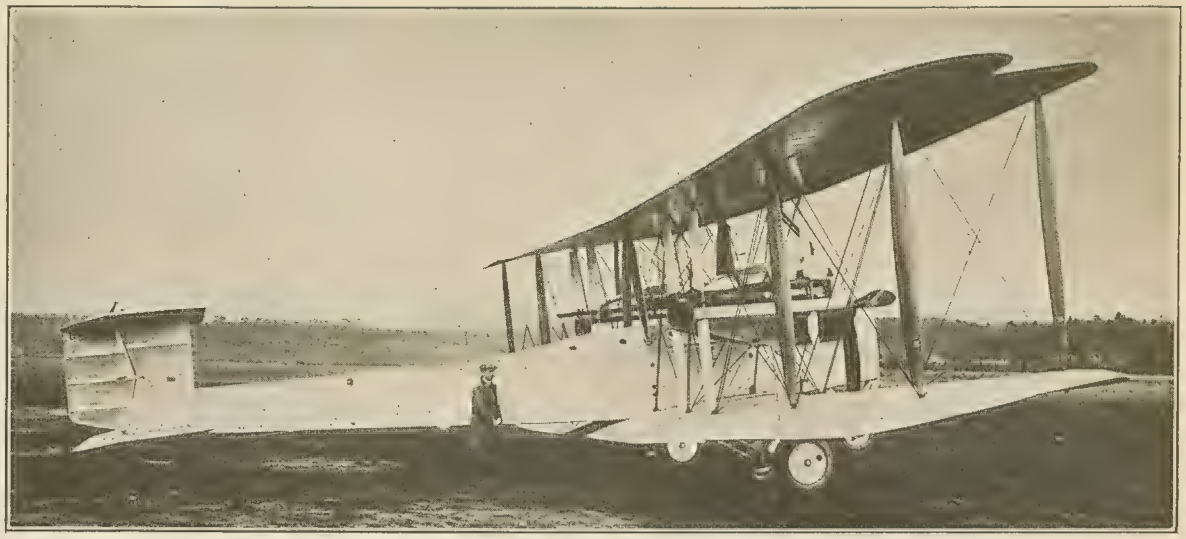


Photo Underwood & Underwood.

The Vickers-Vimy Biplane momentarily expected to start from St. Johns on a Trans-Atlantic flight

After the luncheon the party proceeded to Terrace House, overlooking the Thames. Here the airmen were photographed with the Prince of Wales, who talked with them a quarter of an hour.

R-34 to Start Soon

The British naval airship R-34 was formally taken over by the British Admiralty on May 29. It is announced that the vessel will attempt to cross the Atlantic within the next fortnight.

The R-34 is of the rigid type and was built on the Clyde by Armstrong, Whitworth & Co.

The length of the R-34 is 670 ft., and the diameter 79 ft. She carries four gondolas, one forward, one aft, and two abreast of each other amidships. Her motive power is derived from five Sunbeam-Maori engines, each of 250 hp. These are designed to run at a maximum speed of 2500 revolutions a minute, at which speed the vessel, under moderately fair weather conditions, has been driven at 70 m. p. h.

Twenty-one Hours Aloft

The official commissioning of the R-34 was followed by a flight to East Fortune air station, in the course of which the vessel was lost in the fog and remained 21 hours aloft.

It was expected that she would arrive at East Fortune within an hour or so, and food for the crew sufficient for only a short trip had been taken aboard. Two hours after the start the airship was over East Fortune, but owing to the haze it was deemed expedient that it should remain aloft.

From the North Sea a thick fog developed, and during the night the officers realized that they were completely lost. At last they found themselves 20 miles over the North Sea. Subsequently they reached the aerodrome and cruised overhead all night in the hope of landing in the morning. But the fog prevented this, so eventually they steered south.

There being no sign of the airship in the morning, a smaller vessel went up in search of her. It was stated that the airship was found over Harwich. About 9 A. M. a wireless message was received from the R-34 notifying the watchers that she was in the vicinity of Bamborough Head, Northumberland. About an hour later a second wireless message gave her position as near May Island, just outside the Firth of Forth, and about 30 miles as the crow flies from East Fortune.

In the afternoon, when the fog lifted, the R-34 was able to descend at her destination. The crew, after twenty-one hours in the air, were in a state of exhaustion from the want of food. The most troublesome passengers were three dogs and a cat, who were manifestly uncomfortable the whole time.

General Maitland, head of the British Airship Service, who was aboard the R-34 when she was lost in a fog, has had his confidence in an airship's ability to cross the Atlantic increased by the incident. He regarded his trip as the first practical demonstration that it does not much matter what the weather is like once an airship is up, since she can stop in the air and hang about indefinitely until conditions become favorable.

Getting Ready at St. John's

On June 7, in accordance with the regulation established by the Admiralty after the narrow escape of Hawker and Grieve from death in the mid-Atlantic, requiring four days' advance notice of a transatlantic start, Capt. John Alcock, the Vickers-Vimy pilot, gave formal notice at St. Johns, N. F., that he would start his transatlantic flight June 11. This notice was sent broadcast by wireless.

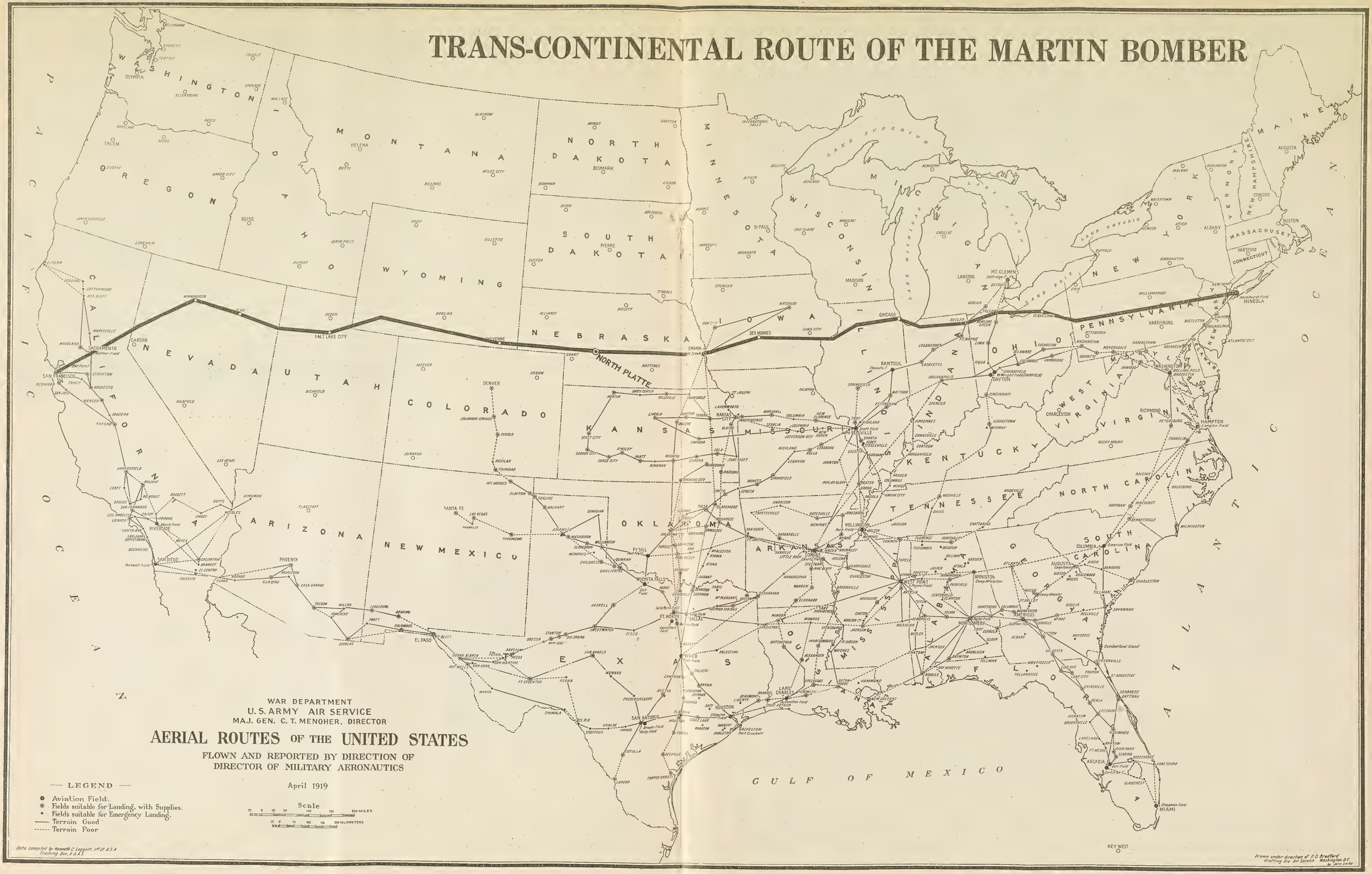
The Admiralty's purpose is to have all ships in the Atlantic on the lookout. A destroyer patrol at the far end of the course is also believed possible.

Lieutenant Arthur W. Brown, navigator of the Vickers-Vimy bomber, has received word from Lieut. Commander R. E. Byrd, U. S. N., that the Navy Department has shipped to him one of the bubble sextants designed by Lieut. Commander Byrd for the American seaplanes.

These sextants have been the envy of all the navigators who have seen them, and Lieutenant Brown expressed himself as greatly delighted and keenly appreciative of the navy's willingness to help him by lending the instrument.

The Handley Page will probably be ready for the attempt soon after the Vickers-Vimy.

TRANS-CONTINENTAL ROUTE OF THE MARTIN BOMBER



WAR DEPARTMENT
U. S. ARMY AIR SERVICE
MAJ. GEN. C. T. MENOHER, DIRECTOR

AERIAL ROUTES OF THE UNITED STATES
FLOWN AND REPORTED BY DIRECTION OF
DIRECTOR OF MILITARY AERONAUTICS

April 1919

— LEGEND —

- ● Aviation Field.
- ◉ Fields suitable for Landing, with Supplies.
- • Fields suitable for Emergency Landing.
- —— Terrain Good
- ------ Terrain Poor

Scale
25 0 25 50 100 150 200 MILES
25 0 50 100 150 200 KILOMETERS

Data compiled by Kenneth C. Leggett, 1st Lt A.S.A
Training Div, O.D.A.S

Drawn under direction of F. D. Bradford
Drafting Div Air Service Washington D.C.
by John Locke

Glenn H. Curtiss and the NC Boats

(*Continued from page 7*)

pared by Lieut. Porte himself. They were larger than the "America," but followed closely the general lines. The F-2-A and the F-3 and also the "Felixstowe Fury," the boat that Lieut. Porte is now bringing to Newfoundland for a trans-Atlantic attempt, are the best known examples of what England has done with the Curtiss flying boat, introduced into Great Britain from America.

After the "America" came the Model T, which was developed by the Curtiss Company. This was the largest flying boat ever built. It had a wingspread of 133 feet and was of triplane form.

The Curtiss Company continued to develop flying boats and among the models built and used during the war were the H-16-A, the HS-2-L and the "Sea Gull," formerly known as the MF.

It was in the fall of 1917 that Rear Admiral D. W. Taylor, chief constructor for the navy, initiated the work which resulted in the NC boats. A form of aircraft was needed to combat the submarine and the NC's were designed primarily as submarine detectors. In his letter to Naval Constructor J. C. Hunsaker, Admiral Taylor stated that the ideal solution of the submarine menace would be flying boats that would be able to keep the sea in any weather and also able to fly across the Atlantic to avoid difficulties of delivery.

Curtiss and the NC Boats

On Sept. 9, 1917, Glenn H. Curtiss, of the Curtiss Aeroplane and Motor Corporation, was requested to go to Washington for a conference. With him went W. L. Gilmore and Henry Kleckler, airplane engineers for the Curtiss corporation. After going over the preliminary plans prepared in the bureau of construction, Mr. Curtiss proposed that the design have a short hull with a tail carried high above the water on outriggers as on one of the Curtiss models and the idea was adopted in view of its greater seaworthiness and weight-saving.

The contract for the construction was awarded to the Curtiss Corporation at Buffalo and Naval Constructor G. C. Westervelt, U. S. N., was sent there as field representative. Active work on the detail design was begun in Buffalo early in October and shortly after, Naval Constructor H. C. Richardson was also assigned to Buffalo in connection with the hull design work. Mr. Gilmore, of the Curtiss Corporation, had most to do with the structural details of the boat.

Built the Four NC's

When the work on the NC-1 had progressed far enough to prove its fulfillment of all expectations, a contract was awarded to Curtiss Engineering Corporation for four boats of this type and the first, the NC-1, was completed and flown on Oct. 4, 1918, one year from the commencement of the design.

Work on the other three continued apace and, only a few weeks before the time set for the trans-Atlantic flight, the NC-4 was delivered.

Mail Airplane Bidders

Here is a summary of the bidders; time of delivery and price on ten mail airplanes, opened June 2:

Unit Construction Co., Philadelphia, Pa., 300 days, 1st plane within 180 days, $339,700 all.

Thomas-Morse Aircraft Corp., Ithaca, N. Y., 5 machines in 150 days, $140,000—10 machines in 225 days, $266,500.

Thomas-Morse Aircraft Corp., Ithaca, N. Y., $28,000 each in lots of 5—$26,650 each in lots of 10.

Aircraft Engineering Corp., New York, N. Y. (10 planes) 1st plane, 6 months after receipt of order; 2nd 10 months after receipt of order, balance within 14 months or at rate of 2 per month, $49,500 each, equipped with 12 A. E. C. motors.

Aircraft Engineering Corp., New York, N. Y. (1 plane), 6 months from receipt of order, $90,000 each, equipped with 12 A. E. C. motors.

Gallaudet Aircraft Corp., East Greenwich, R. I., 1st machine 6 months, 2nd machine 2 mos. after acceptance of 1st, $39,500 each; 3rd and 4th, 3 mos. after acceptance, $32,500 each; 5th 6th and 7th 4 mos. after acceptance of 1st machine. 8th, 9th and 10 machine, 5 mos. after acceptance of 1st machine, $29,500 each.

Lawrence-Lewis Aeroplane Co., Chicago, $26,500 each, equipped for 2 Liberty motors.

Alfred W. Lawson, Milwaukee, Wis., 95 days from date of signing contract and one a week thereafter, $28,000 each equipped with 3 Liberty motors.

L-W-F Engineering Co., College Point, L. I. Model H. 1st plane 60 days, bal. 6 mos., $35,000 each; Model K-2 300 H. P. Hispano motors, $14,950 each 1st 90 days, balance 6 months, equipped with 3 Liberty motors.

Aeromarine Plane & Motor Co., New York, N. Y., 1st machine 5 months after date of contract, 2nd machine 30 days, then 1 every 10 to 15 days, $65,000 1 machine; $55,000 each 2 machines; $50,000 each 3 to 5 machines; $45,000 each 10 machines.

Lawson Air Line Transportation Co., Milwaukee, Wis. With Curtiss K-12 cyl. motor, 99 days from date of signing contract for 1st machine and 1 a week thereafter, $24,000 each, equipped with 2 motors; add $10,000 each. Dept. furnish motors. Price flat $19,000 each.

Charles B. Kirkham, New York, 1st machine within 6 months from date of award, 2nd within 30 days, 3rd and 4th within 60, 5th, 6th and 7th within 90 days; 8th, 9th and 10th within 120 days, $34,250 each.

G. Elias & Bro., Buffalo, N. Y., 1st plane within 150 days, bal. 90 days after acceptance of 1st, $44,500 each.

The Glenn L. Martin Company, Cleveland, Ohio, 180 days from date of order, $31,600 each.

The British & Colonial Aeroplane Co., Ltd., Bristol, England, $13,600 (without engines).

When Opportunity Knocks

Capt. Leopold Stocker, Air Service, U. S. A., writes:

"Here are some commercial reasons why a young man who is willing to stake a short period of his life in acquiring knowledge that will net him large financial return in the future, should enlist in the Air Service:

"First:—As the slogan of the telephone and telegraph companies in the past ten years has been 'Don't write. Wire' so the slogan of the commercial Air Industry will be 'Don't ride. Fly.'

"Second:—The airplane today is in its comparative infancy, its future possibilities being only limited by the bounds of human imagination and inventive genius, there are those who will say with skepticism that this or that cannot be done, but as Elbert Hubbard says: 'When a man says a thing cannot be done in this world he is generally interrupted by somebody doing it.'

"Third:—Take the question of the airplane as an adjunct and possible competitor of the telephone and telegraph, in place of the night letter telegram which under present conditions is not delivered until the next day—this class of business will be carried by airplane with greater saving in time and less liability for error in transmission as the message will be delivered in its original typewritten form. It will eventually obviate the necessity of laying and operating at great expense short submarine cables in locations where owing to natural disturbances, such as earthquakes and volcanic action such cables are hard to maintain and in a great many cases, in case of interruption or trouble, it takes days for the nearest cable repair steamer to reach the point of the break to make repairs. Again there are localities such as the Bering Straits where on account of ice and strong currents it is impossible to lay and maintain a cable successfully. Communication between such points can be established and maintained by airplane.

"Fourth:—As an adjunct to long distance telephone lines and to the telegraph during interruptions caused by storms it will be invaluable as recent demonstrations have shown that the airplane in the hands of a competent pilot can overcome this disadvantage successfully, and it will be invaluable for use in reaching isolated districts where the cost of constructing a telephone or telegraph line and maintaining it would be prohibitive. In other words, the science of air navigation will do for the isolated regions of the world what scientific irrigation did for the desert regions of the earth, viz, bring them in close touch with civilization, thus enabling the inhabitants to derive the numerous benefits attendant thereto.

"Fifth:—It will also be an adjunct and possible competitor of the express companies in the transportation of bullion from mines in isolated localities to the nearest commercial centres, and also in the transportation of valuables of all kinds, as while there is no doubt but that the future will develop the bandit of the air, the airplane will follow no absolutely prescribed route as the railroad and automobile must, and a holdup will be harder to carry out and of rare occurrence.

"Sixth:—As the cavalry of the clouds has to all practical purposes superseded the land cavalry in military operations so will they undoubtedly supersede certain forms of land transportation now in use today. For the young man of energy, the spirit of adventure and gifted with imagination what branch of the transportation field offers greater possibilities. By enlisting in the Air Service you can secure the advantage of training that will fit you for this profession so that when 'opportunity' knocks at your door you will be ready to step out and take full advantage of all she has to offer."

Air Service Statistics

The following was prepared by the Statistics Branch, General Staff, War Department:

AIR SERVICE.

Progress in Training:

During the week ended May 15, 1919, the status of training activities, as compared with the date of the armistice, was as follows:

Attendance.	Elementary Schools.	Advanced Schools.	Total.
Nov. 11	2423	2676	5099
May 15	276	18	294
Graduations.			
Nov. 11	208	96	304
May 15	155	..	155

Hours flown at flying fields. Week ended—	Hours flown.
Nov. 11	23,493
May 15	10,135

Comparison of Flying Fatality Rates.

The flying fatality rate shows a marked increase over the rate during the war. The number of fatalities and the flying hours per fatality from June 1, 1918, to the armistice and the period since the armistice to May 1, are as follows:

Period.	Fatalities.	Hours flown per fatality.
June 1 to Nov. 11	156	3149
Nov. 11 to May 1	71	1467

The serious accident rate (exclusive of fatalities) reflects a similar tendency

Period.	Serious accidents.	Hours flown per serious accident.
June 1 to Nov. 11	169	2907
Nov. 11 to May 1	71	1467

Air Exhibition at Chanute

Ten thousand people witnessed the aeronautical demonstrations on Decoration Day. Among the distinguished guests were Hon. Wm. B. McKinley, Member of Congress, Major J. A. Keting, A. S. A. Military Aviator, American ace officially credited with nine enemy planes; Major R. W. Schroeder, A. S. A., J. M. A. McCook Field, holder of world's altitude record; Major Henry Abbey, Jr., commanding Scott Field; Lieut. Glen Sitterly, Air Service French Army ace, decorated. Under direction of Commanding Officer Lieut. Col. Ira Longanecker, A. S. A., J. M. A., flight formation of nine planes and acrobatic exhibitions were given.

Arizona-New Mexico Routes

Capt. Louis E. Abbey is in command of three airplanes flying over portions of Arizona and New Mexico, mapping routes and encouraging recruiting. The desert is often a desirable place for landing, even for planes of the large De Haviland type.

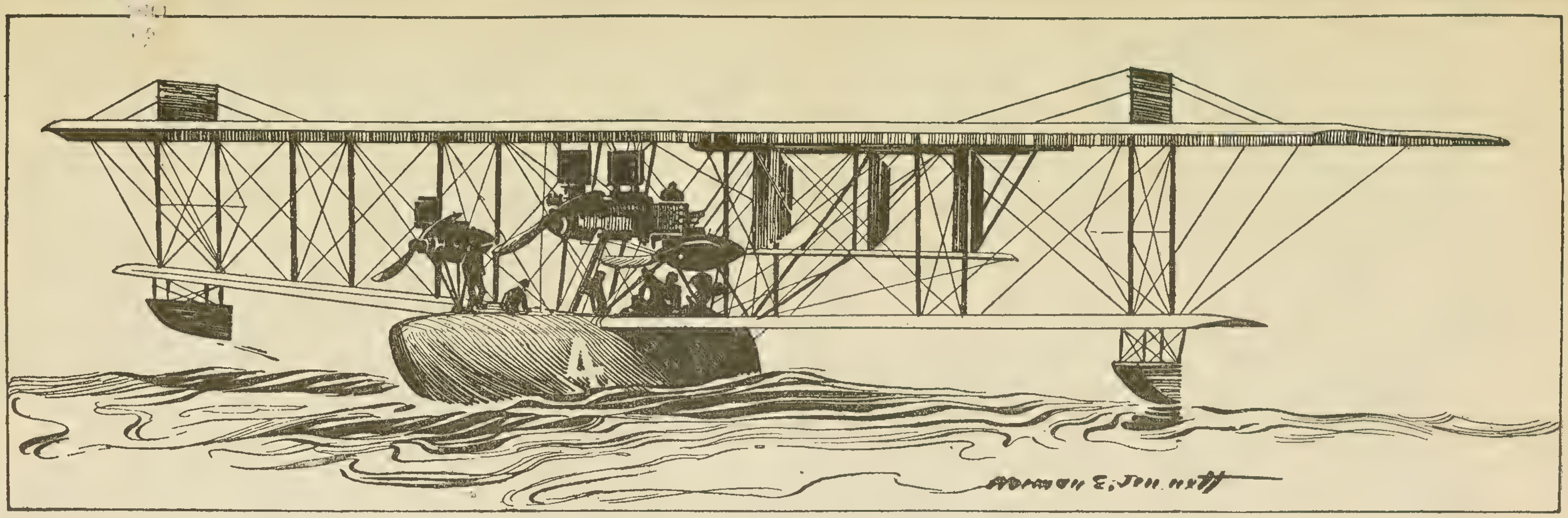
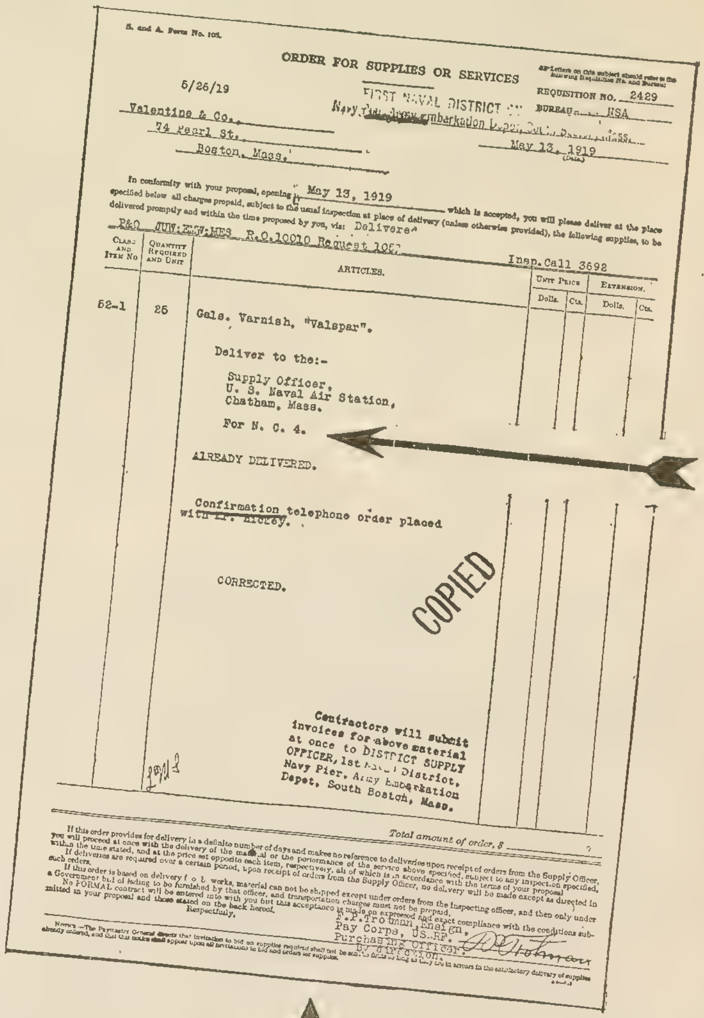


Photo © Press Pub. Co.

The NC-4 is Valsparred

Once more it has been conclusively demonstrated, in the most spectacular flight in history, that Valspar is the *supreme* varnish.

The Navy Department varnished the NC-4 with Valspar because of its absolute *waterproofness,* its unequalled *toughness,* and because it possesses the marvelous *elasticity* required to stand the terrific vibration of a seaplane in flight.



S. and A. Form No. 101.

ORDER FOR SUPPLIES OR SERVICES

Letters on this subject should refer to the following Requisition No. and Bureau

5/26/19

FIRST NAVAL DISTRICT
Navy Pier, Army Embarkation Depot, South Boston, Mass.

REQUISITION NO. 2429
BUREAU NSA

Valentine & Co.,
74 Pearl St.,
Boston, Mass.

May 13, 1919
(Date)

In conformity with your proposal, opening May 13, 1919 which is accepted, you will please deliver at the place specified below all charges prepaid, subject to the usual inspection at place of delivery (unless otherwise provided), the following supplies, to be delivered promptly and within the time proposed by you, viz: Delivered

P&O JUN:ESW:MES R.O.10010 Request 1052

Insp. Call 3692

Class and Item No	Quantity Required and Unit	Articles.	Unit Price Dolls.	Unit Price Cts.	Extension. Dolls.	Extension. Cts.
52-1	25	Gals. Varnish, "Valspar".				

Deliver to the:-

Supply Officer,
U. S. Naval Air Station,
Chatham, Mass.

For N. C. 4.

ALREADY DELIVERED.

Confirmation telephone order placed with ~~Mr. Hickey~~.

CORRECTED.

COPIED

Contractors will submit invoices for above material at once to DISTRICT SUPPLY OFFICER, 1st Naval District, Navy Pier, Army Embarkation Depot, South Boston, Mass.

Total amount of order, $

If this order provides for delivery in a definite number of days and makes no reference to deliveries upon receipt of orders from the Supply Officer, you will proceed at once with the delivery of the material or the performance of the service above specified, subject to any inspection specified, within the time stated, and at the price set opposite each item, respectively, all of which is in accordance with the terms of your proposal.

If deliveries are required over a certain period, upon receipt of orders from the Supply Officer, no delivery will be made except as directed in such orders.

If this order is based on delivery f. o. b. works, material can not be shipped except under orders from the inspecting officer, and then only under a Government bill of lading to be furnished by that officer, and transportation charges must not be prepaid.

No FORMAL contract will be entered into with you but this acceptance is made on expressed and exact compliance with the conditions submitted in your proposal and those stated on the back hereof.

Respectfully,

F. P. Trotman, Ensign,
Pay Corps, US.RF.
Purchasing Officer.
By direction.

NOTICE.—The Paymaster General directs that invitation to bid on supplies required shall not be sent to firms so long as they are in arrears in the satisfactory delivery of supplies already ordered, and that this notice shall appear upon all invitations to bid and orders for supplies.

Here's the Original Order which specifically states that the Valspar is for the NC-4.

Valentine Products used by the world's leading airplane makers include:

- Valspar Varnish
- Valspar Low Visibility Gray Enamel
- Valspar Olive-Brown Enamel
- Valspar Black Enamel
- Valspar Khaki Enamel
- Valspar Filler (Wood)
- Valspar Primer (Metal)
- Valspar Primer (Wood)
- Valspar Aluminum Paint
- Dipping, Spraying and Brushing coatings of all kinds
- Quick-Drying Insignia Colors
- Valenite
- Valenite Enamels

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The Varnish That Won't Turn White

VALENTINE & COMPANY
456 Fourth Avenue, New York
Largest Manufacturers of High-grade Varnishes in the World
ESTABLISHED 1832

New York Chicago Boston Toronto London Amsterdam

VALENTINES VARNISHES
(Trade Mark)

W. P. FULLER & Co., San Francisco and Principal Pacific Coast Cities

Congress and the Air Services

(*Continued from page 3*)

20 Thomas Scouts				
Hispano Suiza 300 hp.				
Cost of Plane	$16,500	$330,000		
Cost of Motor	5,000	100,000		
	$21,500	$430,000	$430,000	
Plane spares.	66,000			
Motor spares.	10,000			
	$76,000		76,000	
Total				506,000
46 Epeditionary Water Planes (Type being developed)				
Cost of Plane	$8,000	$368,000		
Cost of Motor	5,000	230,000		
	$13,000	$598,000	$598,000	
Plane spares.	73,600			
Motor spares.	23,000			
	$96,600		96,600	
Total				694,600
Grand Total				$2,996,500
LIGHTER-THAN-AIR.				
2 Small twin motored dirigible			$80,000	$160,000
Establishment of flying station with advanced base units at the following places:				
Quantico, Va.			$185,000	
Paris Island, S.			200,000	
			$385,000	385,000
Total for Marine Corps				$3,541,500
L. For drafting, clerical, inspection, and messenger service as provided in the act of the third session of the 65th Congress (H. R. 15539)				$300,000
Total Navy for Aviation				$45,578,632

Statements at the Hearing

The hearing of the House Committee on Military Affairs was so obviously a matter of form that few of the important matters that should have received consideration were more than mentioned. Chairman Kahn stated that he would confine the discussion to the items for which appropriations were asked, leaving the broader questions of policy to the hearings on the Army Reorganization Bill to be held later.

General Menoher, Director of the Air Service, said that the estimate presented was on the basis of 24,000 officers and men as part of the Army of 509,000 as outlined by the General Staff. It was important that the squadrons of the Air Service which had done brilliant work overseas be held together and kept intact and to do this equipment would have to be purchased which would give them airplanes which were not obsolete. He stated that the Secretary of War had directed that no money appropriated for war conditions should be paid for peace aviation.

The project for taking over the Dayton-Wright Co. plant for the McCook Field experimental work was discussed as well as the taking over of the Curtiss Elmwood plant. It was stated that as the Government already owned the Hispano-Suiza engine plant at Long Island City, the plan was being considered of keeping it as a storage plant for tools and machines, and to allow engine builders to use the plant, thereby saving some of the amortization charges.

It was pointed out that the last air service request was for $35,000,000 as against $83,000,000 requested now.

There was an interesting discussion regarding the Martin Bomber. General Menoher stated that five Handley Page machines were assembled in this country, four of which were out of commission, while four Martin Bombers were delivered which had flown more hours than the Handley Pages and all were still flying. He stated that to assemble a Handley Page would cost $29,000. The Committee seemed to feel that most of the money expended during the war for airplanes would be wasted as much of the equipment purchased would have to be junked.

Rigid Dirigible Included

The appropriation of $31,000,000 for airplanes and motors was for the purchase of 1,100 planes including renewals and spare parts. A rigid dirigible of 2 million cu. ft. was included in the estimate for lighter-than-air craft.

The information was brought out that the Secretary of War had disapproved the retention of Bolling Field in Washington and the opinion of the Committee seemed to be that it was unfortunate that at the Capital there would be no flying field. General Menoher stated that he believed that every city in the country should have a flying field.

The hearing closed by a statement by Colonel Hall, Chief of Procurement regarding the Liberty Engine. His assertions regarding the opinion of English and French Air Service officials that it was superior to other engines was questioned by Congressman La Guardia, who grilled Colonel Hall as to the sources of his information.

The hearing before the House Naval Affairs Committee was attended by Secretary Daniels. Captain Craven, Director of Naval Aviation, presented the analysis of the amounts required by the Navy for 1920. At the conclusion of the hearing, which consisted chiefly of an explanation of the various items, Chairman Butler stated that all estimates in the future should be in detail, as the House would not look favorably on lump estimates this season.

City College Aeronautics

Evening courses on aeroplanes and aviation engines at the College of the City of New York having met a popular demand, the authorities have decided to repeat these classes during the Summer Session commencing July 1.

Then enrollment in the aeronautic classes at the college during the present year has been 586 students. The laboratory equipment used in the instruction includes aeroplanes and motors donated.

MEMO: Write today for new folder containing pictures and specifications of THE ACE, America's first after-the-war airplane designed essentially for civilian use. Daily flights now in progress at our flying field at Central Park, L. I.

AIRCRAFT ENGINEERING CORPORATION

Sales Offices: 220 West 42d St., New York

New York Flying School

A LIMITED NUMBER

OF

SELECT STUDENTS

are being enrolled for tuition at the above school situated within 30 minutes of Times Square (in New York State) under the instruction of American "Aces" and retired service instructors using modern military training 'planes. EVERY BRANCH of aeronautics, from ground mechanics to Cross-Country flying with map and compass will be included in the course.

COMPLETE COURSE

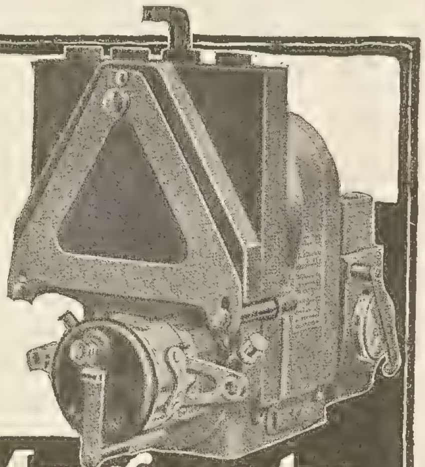
including all flights for Civilian License $500.00 with no charge for breakage.

For further particulars, apply by mail to

D. I. LAMB, (lately Military Aviator)

11 East 38th Street New York City

Half of the American airmen have proved the Berling's worth.



Berling Magneto

WORTH MORE DOES MORE

For Your Seaplanes Use

Upward of 5,000 gallons of Jeffery's Patent Waterproof Liquid Glue has been used by the U. S. Navy and War Departments during the past year, and as much more by the various manufacturers of seaplanes having government contracts.

L. W. FERDINAND & CO.
152 Kneeland Street
BOSTON, MASS., U. S. A.

The design and production of commercial aircraft and the construction of flying fields and airdromes with complete equipment are only a few of the many details in connection with commercial aviation which our staff of engineers can intelligently handle.

United Aircraft Engineering Corporation
52 Vanderbilt Avenue, New York, N. Y.
F. G. Diffin, *Pres.* R. U. Conger, *Vice-Pres.*

U.S.

U. S. Letters for collar insignia as prescribed by General Orders No. 74

FOR ALL OFFICERS OF THE UNITED STATES ARMY

Bronze of best quality with safety catch, 60 cents per set; without safety catch, 50 cents per set. Ready for immediate shipment.

The official standard samples on file with the War Department were manufactured by this Company.

Bailey, Banks & Biddle Co.
PHILADELPHIA, PA.

Thomas

THOMAS-MORSE AIRCRAFT CORPORATION
CONTRACTORS TO THE U.S. GOVERNMENT
ITHACA, N.Y. U.S.A.

Air Service News

Production Figures

The following is issued by the Statistics Branch, General Staff of the War Department:

French Planes and Engines Available for Shipment to U. S.:

It is estimated that the following planes and engines will be available for shipment to the United States as the result of settlements with the French:

600 Spad-4 airplanes.
1000 Nieuport-28 airplanes.
1000 Hispano-Suiza 220 hp. engines.
800 Gnome 150 Monosoupape engines.

94 Service Engines Remaining on Order:

The only service engine now on order is the Hispano-Suiza 300 hp. type; 406 have been delivered, leaving 94, or 19 per cent, still on order.

21 Per Cent of De Haviland 4 Planes Produced to Armistice Reached Zone of Advance:

Of the total number of De Haviland 4 planes produced before the armistice, nearly one-third reached the Zone of Advance or the training fields in France before hostilities ceased. The following table compares the total production with the distribution overseas on the date of the armistice:

		Per cent of total Produced.
Produced	3227	100
Floated	1885	58
Received, A. E. F.	1440	45
Dispatched to Zone of Advance	667	21
Dispatched to training fields, A. E. F.	293	9

Air Service Promotions

Lt. Col. J. A. Mars, Director of Aircraft Production, promoted to Colonel.

Lt. Col. W. F. Pearson, Chief, Administrative Group, promoted to Colonel.

Lt. Col. Oscar Westover, Assistant to Executive Officer in the office of the Director of Air Service, promoted to Colonel.

Major Horace M. Hickam, Chief, Information Group, promoted to Lieutenant Colonel.

Bogus Victory Ribbon

Gen. Peyton M. March, Chief of Staff, issues this statement:

"My attention has been called to the fact that a so-called Victory Ribbon, representing the Victory Medal which is given by all the Allied Governments to troops serving in the war, is being sold by military stores in the United States, but it does not correspond to the actual Victory Ribbon. A great many men in civil life, already demobilized, who are entitled to wear the ribbon are buying these ribbons. We are having some difficulty in securing the colors for the Victory Ribbon, but when the ribbon is finally manufactured it will be issued by the Quartermaster Department to men entitled to wear it. They ought not to buy this other ribbon, which does not represent really what the Victory Medal symbolizes."

Comparative Airplane Strength

Comparison of airplane strength of allies and enemy air service at date of armistice:

French and Belgian Front	Number of Planes
French	3,321
German	2,730
British	1,758
American	740
Belgian	153
Total Allied	5,972
Total Enemy	2,730
Italian Front	
Italian	812
Austrian	622

Comparison of balloon strength of allied and enemy air services at date of armistice:

French and Belgian Front	Number of Balloons
German	170
French	72
British	43
American	23
Belgian	6
Total Allied	144
Total Enemy	170
Italian Front	
Italian	32
Austrian	26

Working On New Aerial Route

The Engineering Department at Kelly Field in cooperation with the Air Service is working on a new Aerial Route from San Antonio, Texas, to Yuma, Arizona. The first part of the work was to make a reconnaissance of the whole territory.

Answers to Correspondents

All bona fide inquiries will be answered by letter to the inquirer and included in these columns. Questions should be accompanied by stamped addressed envelopes.

L. C.—Steel propellers have been used in one or two cases. The question is still experimental. There is no reason why steel propellers should not be used, but they may be heavy and not stand up under alternating stress.

A two-bladed propeller will give less thrust than a four-bladed one, when the blades in each case are of similar dimensions.

Hawker's Sopwith had a Rolls-Royce "Eagle" 400 hp. engine. In a recent test, this machine covered a distance of 900 miles in 9 hrs. and 5 min., using 146 gal. of fuel.

H. J. B.—The tapered form of wing, narrowing down at the tips, presents a slight improvement in aerodynamic efficiency over the untapered wing.

It has the disadvantage of necessitating all different ribs, which is a drawback in production.

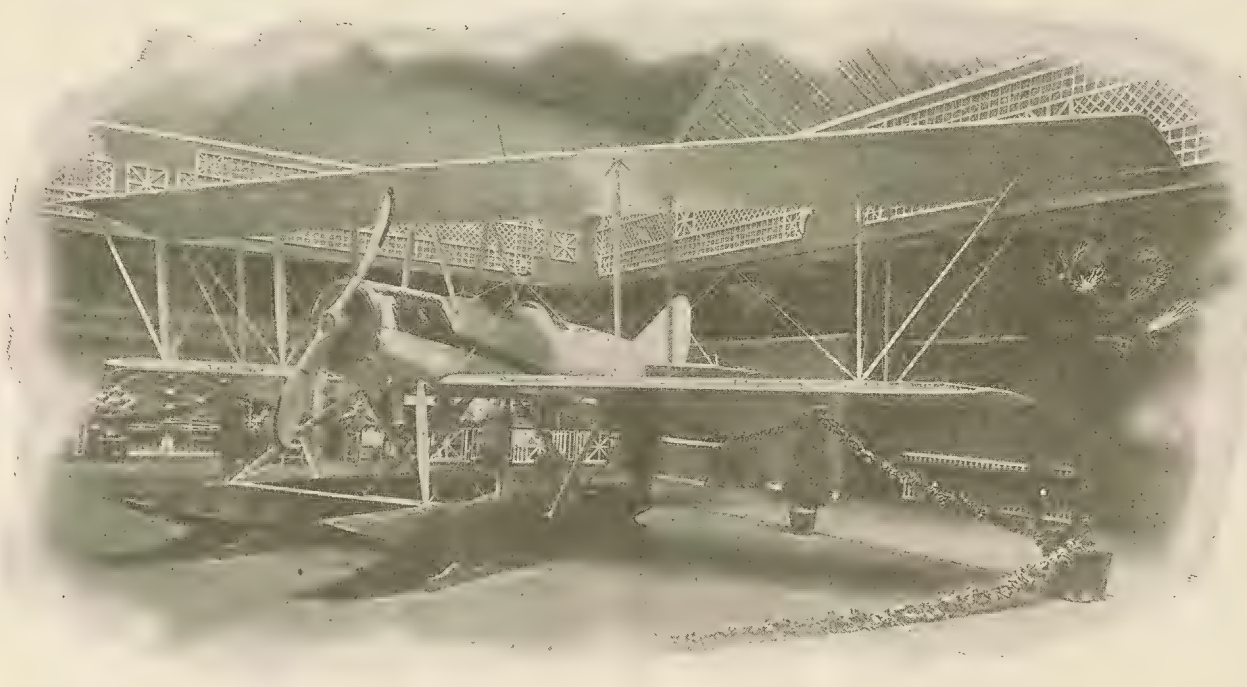
H. G. S.—Among the insurance companies interested in aviation insurance are the Queen Insurance Co., 85 William Street, New York; Travellers' Insurance Co., 45 John St., New York; and Merchants' Assurance Co., Hartford, Conn.

Casale's New Record

Adjutant Casale, a French aviator, ascended to a height of 31,168 feet, June 7. On May 28 Adjutant Casale ascended to 31,000 feet, or 152 feet less than his new mark.

Lieut. Welsh's Fast Climb

Lieut. James W. Welsh, A. S. A., R. M. A., in a De Haviland 4 attained an elevation of 19,000 feet in 53 minutes.



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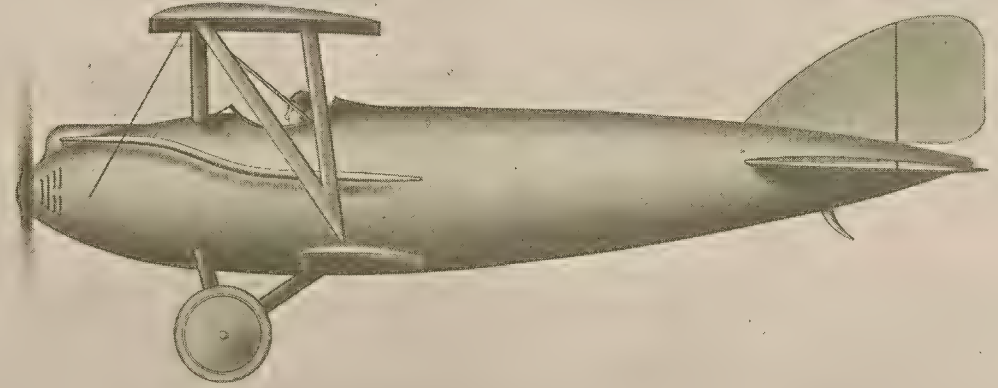

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Great Feat of the A-4

A new era has been inaugurated in the aeronautic world in the wonderful performance of the first dirigible balloon built for the United States Army during the recent war—the A-4. This big airship, of the type familiarly known as "blimp," with army civilian pilot James Shade at the wheel has just made the trip from the Wingfoot Lake Air Station, near Akron, Ohio, to Cleveland, landing on the roof of the Statler Hotel, discharging two passengers and immediately returning to its hangar 50 miles distant. This is the first time in the history of aeronautics in America that any type of aircraft has been brought to a quick and convenient stop in the heart of a large city for the purpose of landing passengers.

The occasion was the meeting and dinner of the Cleveland Section of the Society of Automotive Engineers at this hotel at which Ralph H. Upson, chief aero engineer of the Goodyear Tire & Rubber Company, and Major C. H. Maranville, commander of the Army Aircraft Detachment at Akron and Wingfoot Lake, were speakers.

Upson, who is the world's champion balloonist, having won the last great International Balloon Race at Paris, France, with R. A. D. Preston acting as aide, in a wonderful 500 miles flight, conceived the idea of making the trip in a dirigible, and with the full co-operation of the army officers of the dirigible school at Akron, who arranged all details, was able to carry out the project.

Glenn L. Martin, the noted inventor and pioneer manufacturer of airplanes, and one of the country's noted aviators, was the first to greet and congratulate the two passengers as they stepped from the car.

To the thousands of interested spectators of this history-making event the conclusion was inevitable that commercial dirigible navigation is almost upon us.

The performance was not staged as a "stunt," but to show the progress that has been made in the development of dirigibles and the skill with which difficult landings can be made by experienced pilots.

Army officers are delighted with the success of the undertaking. "We gladly entered into the spirit of the affair with the view of stimulating enlistments in the Army airship training service at Wingfoot Lake," declared Major Maranville, who was officially in command of the A-4 on this memorable trip. "The demonstration proves beyond doubt that the airship is practical and that young men that enlist in this service have a wonderful future before them. We were glad to be able to point out that the dirigible has a commercial as well as military value."

The piloting of James F. Shade on this occasion was pronounced by both army and civilian aeronautical engineers as the most skillfull they had ever seen, and stamps him as one of the best dirigible pilots in America. The vast throng that witnessed his work in landing on the hotel roof, apparently realized the difficulties he was overcoming in this pioneer effort and broke into tumultuous cheering as he guided the car of the dirigible to the center of the small improvised platform, erected on the electric sign for this purpose.

First Trip of the C-8

Officials of the Navy Department and naval flyers are much pleased with the performance of the new non-rigid dirigible, C-8, which made a non-stop flight from Akron, O., to Cape May, N. J., June 3, maintaining an average of forty-five miles an hour. The C-8 faced a head wind half the time. She is a sister ship of the ill-fated C-5, which was torn from its moorings at St. John's, N. F., and blown to sea.

The C-8 was completed only a few days ago. Prior to the 410-mile flight from Akron she had made only three or four short flights.

Lieut. Commander Robert F. Paunack, commanding officer at Cape May, went to Akron to bring the C-8 east. He arrived June 2, and announced that he wanted the ship. Told that it had not been flown sufficiently to warrant tackling the run to Cape May, he tried it out afterward announcing he would leave the next morning.

James Still Missing

Capt. Mansell B. James, the British aviator who has been missing since he started May 29, to fly from Lee, Mass., to Mineola, has been traced to a point about twelve and three-quarters miles north of Savin Rock, near New Haven, Conn. The place where a plane, believed beyond question to have been James's, was last seen, early in the afternoon of May 29, is known as Mount Stanford. Observers said the flyer was high, and was veering toward the west.

It was reported also that the motor was plainly heard, which suggests that the aviator was climbing to get altitude for a flight across the Sound. The discovery of witnesses so far south strengthens the growing belief that James flew the Sound and, trusting to his stock of gasoline to hold out, decided to continue over the ocean to Atlantic City, instead of stopping at Hazelhurst Field, as he had talked of doing.

Air Patrol of Forests

The aerial patrol of forests instituted for early discovery of fire has been inaugurated in the Cleveland National Forest, California. Headquarters were established at Warner's Hot Springs, California. A number of airplanes will be used and two patrols made daily.

Handley Page Reaches Houston

A Handley Page airplane carrying ten officers and men in charge of Capt. Clyde C. Dunnington made a flight from New Orleans to Houston, Tex., 362 miles in 245 minutes, completing flight from New Jersey.

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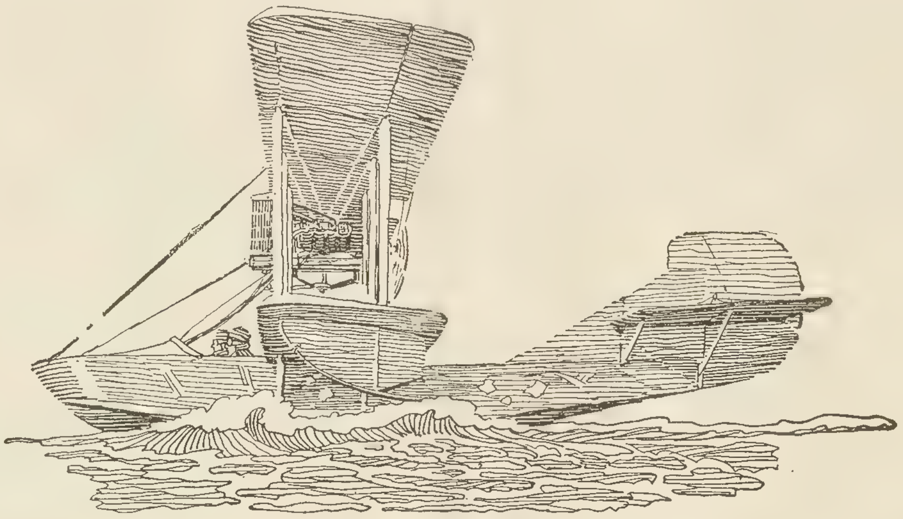

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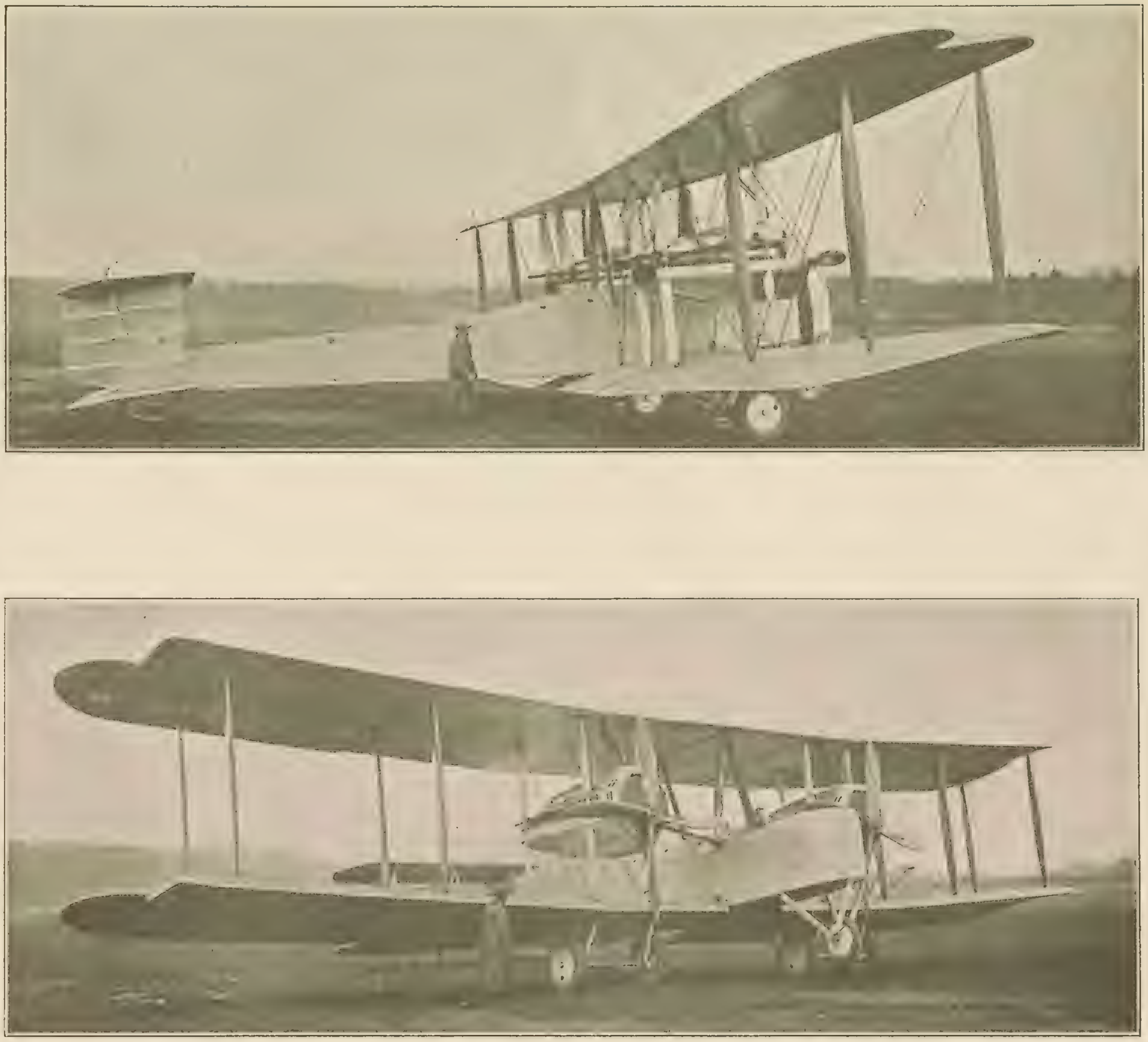
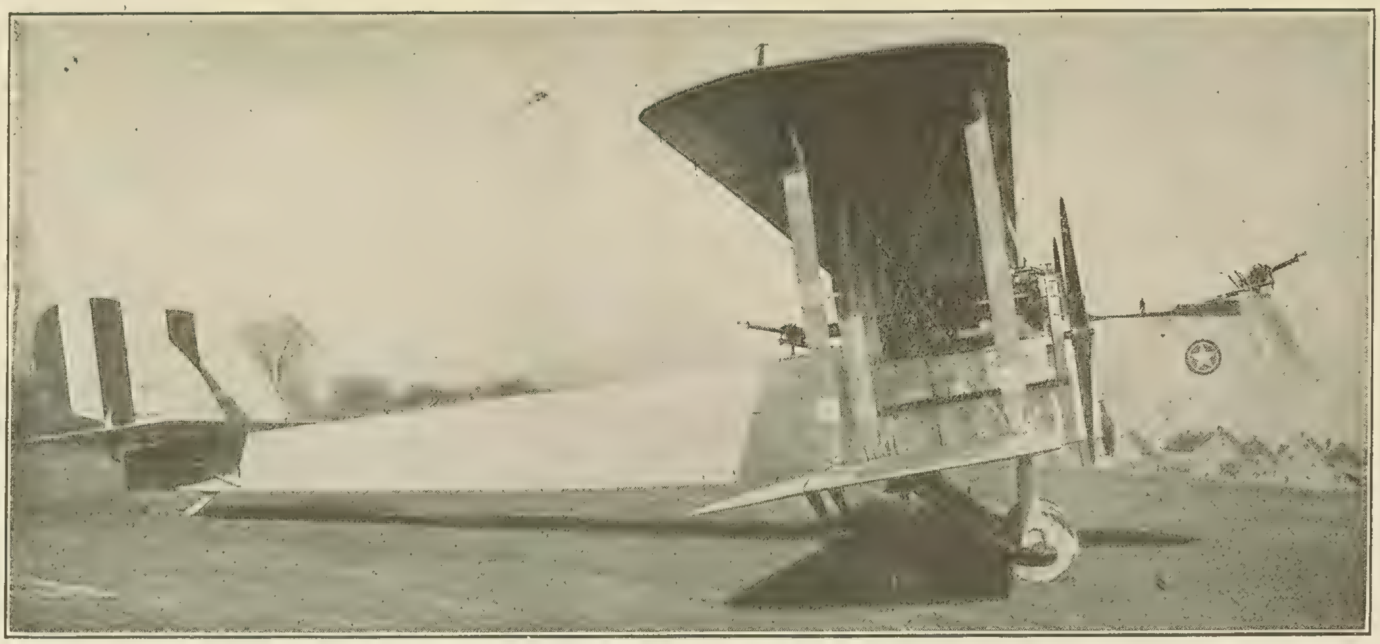
Airplane That Flew Straight Across the Atlantic



The Vickers-Vimy-Rolls Bomber

First Machine to Make a Non-Stop Flight Across the Atlantic—Pilot, Capt. John Alcock, an Englishman; Navigator, Lieut. Arthur Whitten Brown, R. A. F., an American—Time, 15 Hrs. and 57 Min.



THE MARTIN NIGHT BOMBER

THE MOST IMPORTANT AERIAL DEVELOPMENT OF THE WAR

Officially, it has surpassed the performance of every competitor.

The forerunner of the wonderful

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The skill and ability of the HOUSE OF MARTIN continue to maintain Supremacy of Performance and Dependability which they have held since 1909.

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First Honors For Vickers-Vimy-Rolls

Capt. John Alcock and Lieut. Whitten Brown Cross the Atlantic in 15 Hours, 57 Minutes

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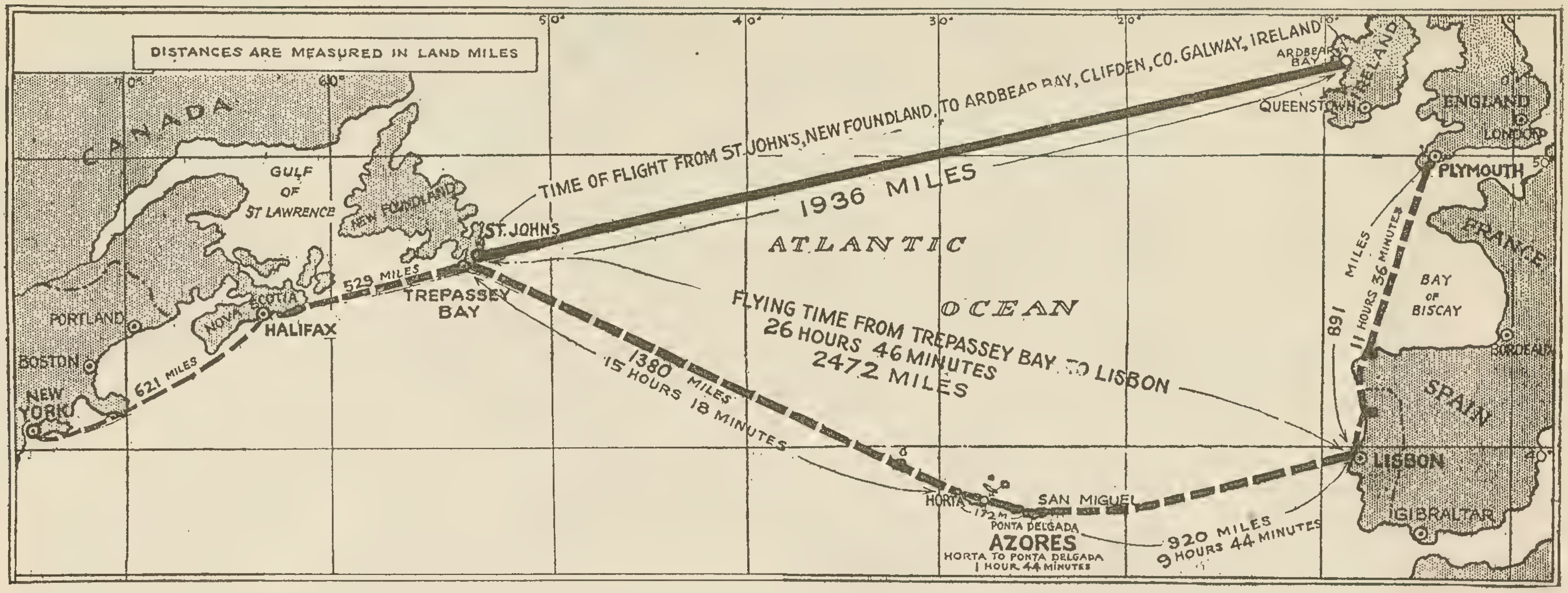
Fifteen hours and fifty-seven minutes from the time the Vickers-Vimy machine took off at St. John's, N. F., on June 14, piloted by Capt. Jack Alcock, with Lieut. Arthur Whitten Brown as navigator, it landed on the Irish coast at Clifden, and the non-stop transatlantic flight was achieved.

It was just 20 minutes before 9 A. M. June 15 (Greenwich time), when Capt. Alcock made his landing. Unfortunately, owing to the muddy ground, he buried the nose of his machine, thereby preventing a continuance of the flight in the same plane to England. The two airmen were not seriously injured in the accident.

At the rate of 117 miles an hour they had crossed the ocean, about 1936 miles, sometimes, as Capt. Alcock said, not knowing whether they were flying upside down in the heavy fog, which prevented them from taking bearings either from the sea or sky.



Showing the Course Taken by the NC-4 and that of the Vickers-Vimy-Rolls

Early in the flight the tiny propellor which actuated the generator of their wireless sending apparatus blew off, and their receiving apparatus was jammed by signals not intended for them.

Captain Alcock's Own Story

In a signed story for the London *Daily Mail*, for whose prize of $50,000 the flight was made, Capt. Alcock says:

" We have had a terrible journey. The wonder is that we are here at all. We scarcely saw the sun or moon or stars. For hours we saw none of them. The fog was very dense and at times we had to descend within 300 feet of the sea.

" For four hours the machine was covered in a sheet of ice caused by frozen sleet. At another time the fog was so dense that my speed indicator did not work, and for a few seconds it was very alarming. We looped the loop, I do believe, and did a very steep spiral. We did some very comic stunts, for I had no sense of the horizon.

" The winds were favorable all the way—northwest and at times southwest. We said in Newfoundland we would do the trip in sixteen hours, but we never thought we should.

" An hour and a half before we saw land we had no certain idea where we were, but we believed we were at Galway or thereabouts. Our delight in seeing Eastal Island and Turbot Island (five miles est of Clifden) was great. People did not know who we were when we landed, and thought we were scouts looking for Alcock.

Sleet " Chewed " Their Faces

" We encountered no unforseen conditions. We did not suffer from cold or exhaustion except when looking over the side; then sleet chewed bits out of our faces. We drank coffee and ale and ate sandwiches and chocolate.

" The flight has shown that the Atlantic flight is practicable, but I think it should be done not with an aeroplane or seaplane, but with a flying boat. We had plenty of reserve fuel left, using only two-thirds of our supply. The only thing that upset me was to see the machine at the end get damaged.

" From above, the bog looked like a lovely field, but the machine sank into it up to the axles and well over onto her nose."

Off for London

A special despatch to the *Daily Mail* from Clifden says: Alcock and Brown left by motor for Galway Sunday evening to catch the first train for London.

" Capt. Alcock said it had been a very trying journey, with bad visibility, fog and rain. He heard no wireless messages en route, owing to the constant jamming of signals not intended for him. His wireless propeller for transmitting messages was blown off five minutes after leaving St. John's. He saw no sun once after attaining a height of 11,000 feet. Only three bearings were possible, owing to bad weather. Alcock said: 'I didn't know once during the night whether I was upside down or not. The fog was awful. Later I had a very narrow escape. I found myself within ten feet of the sea.'

" The engine ran well. One exhaust pipe blew off and made the pilot very deaf. I have nursed my engines all the way and have one-third of my petrol left.' "

" On landing, Lieut. Brown said to Capt. Alcock, 'What do you think of that for fancy navigating?' 'Very good,' was the reply, and they shook hands. The machine will probably have to be dismantled."

Lieutenant Brown to Wed Miss Kennedy Soon

There is something of romance about the flight besides the successful spanning of the Atlantic by air. That is the fact that Lieut. Brown, who was born in Glasgow of American parents, was in reality flying home to his prospective bride, for, according to the London *Daily Mail*—

" Arrangements are on foot for the immediate celebration of the wedding of Lieut. Brown and Miss M. K. Kennedy, daughter of Major D. H. Kennedy, one of the chiefs of the Aircraft Production Department of the Ministry of Munitions, a department in which Lieut. Brown was scheduled for duty and especially released by the Ministry at the request of Messrs. Vickers to act as navigator of the Vimy."

Miss Kennedy lives with her father at Norbiggen, Oakley Avenue, Ealing. The house was decorated with flags and bunting. Miss Kennedy, a charming, dark-complexioned girl, is highly delighted at her lover's success. " I had every confidence in him," she said. " I gave him a small, black fleecy cat for luck, and he fixed it on one of the struts of his machine. Lieut. Brown and I will be married now as soon as possible. I'm very keen on having an aeroplane honeymoon, and I think he would like it also."

Vickers Aviators Rejoice

Nothing could exceed the joy with which the news was received by the aviation staff of Vickers, Ltd., at Knightsbridge. They had kept all-night vigil waiting for the news. Looking at the flight in the light of the first messages and the Air Ministry's report on weather conditions, Capt. Acland said:

" It's fairly clear that after 800 miles, which probably took seven hours, the airmen ran into a fog. Then they had drizzle and mist for 600 miles, during which astronomical observations would be impossible. That distance probably took five to six hours. For the rest of the trip, say 400 miles, they would have good wind and would do the distance in about 3 hours. The machine would be flying the whole time at a cruising speed of ninety-five miles an hour, and the wind would give a higher speed. As a whole, the trip of 1,800 miles was done in a little over sixteen hours. The course held must have been extraordinarily accurate the whole way.

" Brown hit the land within sixty miles of Galway, where he intended to alight. It was a most

(*Continued on page 9*)

Testing U. S. Army Airplane Chutes With Live Weights

Five Drops, Three by Veterans and Two by Inexperienced Men, at the McCook Field Experiments

At McCook Field five drops with live weights have been accomplished with the United States Army airplane chute. Three of the drops were by men who had previously made drops, veterans in fact, but two were made by men who had never dropped before, and who had little time in the air. All of the drops were made by stepping off the steps of a D H-9 machine after the engine had been throttled. Each of the droppers delayed pulling the rip-cord until well clear of the airplane. In four cases the chute opened fully before descending 100 feet. In the fifth case the shroud lines became twisted once. The action was similar to that which would be obtained had the parachute opened normally and then the parachutist had purposely made one revolution, which would wind the entire assembly of shroud lines. The man dropped 200 feet before he accomplished the feat of untwisting himself. During this time the chute was partially open, and had it continued to the ground, it is believed that at the worst, no more serious injury than a broken leg would have resulted. This was due, probably, to the manner in which this parachutist tumbled and twisted when he dropped. It is known that the chute would have automatically untwisted itself very soon without any aid. This has been noted several, but not many, times with dummy drops.

First Live Drop

The first live drop was made by L. J. Irving, who is a veteran dropper. He jumped first, using both hands to do so, and while falling he searched for the pull ring, finding it under his arm, when he coolly jerked it. The second drop was made by Floyd Smith, veteran aviator, who had previously made several drops. The next two drops were made by James Russell and James Higgins respectively, neither of whom had ever dropped before or had been in the air very much. They are employed as parachute mechanics. The fifth drop was made by Sgt. W. R. Bottreill, who has made numerous drops.

The drop by Mr. Irving was made on a day on which the air was quite bumpy. Upon landing the chute struck a down current, which caused a hard landing, breaking one of Mr. Irving's ankles. This taught the lesson of selecting only the best weather for parachute tests.

The other four landings were quite normal and without mishap, the average rate of descent being about 16 feet per second, which is equivalent to a free jump of about 5 feet.

All jumpers so far have used the same chute, which is 28 feet in diameter with a 42-inch, patent, shock absorbing vent, supported by 30 shroud lines of 80 pounds breaking strength.

Further experiments are to be carried out with a view to determining the best method of escape from a plane in a nose dive, spinning nose dive, etc. It is believed that this offers no considerable difficulty.

Engine Throttled

In all live drops so far the engine has been throttled, and it is believed that the emergency is very remote when it will not be possible to close the throttle or cut the switch before jumping. In case the engine is idling, the problem of getting away is not difficult in normal or nearly normal flight, nor is it believed that the matter of speed itself will be bothersome within reasonable limits. There will be ample time to get out of the machine under any circumstances (provided it is far enough above the ground), before a speed is reached which would cause failure of the chute. It will of course be necessary to clear all parts of the machine.

The present adopted type of chute is known as a flat chute, 28 feet in diameter, with a 48-inch flexible vent. It has 40 shroud lines, each of which has a breaking strength of 250 pounds. These are arranged in four groups of 10 each, tied to a D ring, which in turn is sewn into the harness webbing. The strength of the cords attached to any D ring is 2500 pounds; the D ring has a strength of 5000 pounds, while the webbing, as arranged, breaks at 3400. The breast and leg straps are strong out of all proportion. In the cords themselves, which are the weakest part, there is a factor of safety of at least 3 under the most extreme of the conditions named above, as a chute has already successfully passed this test with shroud lines attached to each D ring of only 720 pounds. Failure in fabric is not expected.

(C) *Underwood & Underwood*

Lieut. Herbert Mills, A. S. A., dropping in a parachute

AIRCRAFT JOURNAL

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Telephone, Stuyvesant 4552

Future pack carriers will be both water and fireproof, it is hoped. Chutes must at all times be very carefully packed and it is thought that all fliers should know how, and it seems preferable for each to pack his own chute. Instructions and pictures of the actual operation of packing will be issued as soon as possible.

With each chute is a sample of the fabric, cords, webbing, etc. This is marked with the serial number of the chute, as well as with its tensile strength and should be tested at least monthly to determine its deterioration. In addition, it is thought that each month every chute on hand should be dropped, for test with a 300 lb. weight at 150 m.p.h. or the equivalent thereof.

Chute Steerable

This chute is steerable. By pulling down on one or more of the four webs, the chute can be caused to travel sidewise somewhat. When nearing the ground, the leg straps should be unsnapped and immediately upon touching the ground the breast strap. It may be well in some cases to even unsnap the breast strap a short distance from the ground, holding both ends with the hands close to the body. The knees must be flexed upon striking the ground to ease the shock. At times chutes strike harder than at other times, due to down trends of air, and vice versa. Even if the rubbers in the flexible vent should break the rate of descent will not be dangerously increased. The flexible vent arrangement is primarily for the purpose of insuring better opening. No knots should be placed in shroud lines between vent and D rings as the lines will be weakened at the knot. If any lines break they should be replaced with an entire new line.

At present only one type of pack carrier is prescribed, but it is hoped that in the future three different types will be available so that the chute can be packed in the carrier which will most conveniently fit the airplane to be used in. This pack can be operated either by attaching the rip cord to the plane or by the aviator pulling it himself, either after or before jumping, depending upon circumstances. Of course, in the latter case it would behoove him to be out of his seat, either out on a wing or on the empennage. The attaching of the rip cord to the airplane is not recommended, but in case the aviator desires this arrangement he may simply tie a cord of the desired length into the rip cord ring and to the airplane. Such a cord is not furnished. When the rip cord is pulled, strong elastic bands come into play, which pull the covers of the pack apart and release the pilot chute, which springs open. The pilot chute then pulls the top of the main chute from the pack and holds it taut and straight until it fills with air. However, in case the pilot chute failed to operate, the main chute would be blown out and opened, but not quite so rapidly.

Methods of Leaving Plane

The following are conjectures, but are submitted for what they may be worth:

It is believed the best methods of leaving the airplane will be: (This in case of fire, wing collapse, serious plane failures, inoperative controls, some collisions, etc.)

(*Continued on page 12*)

News of the Army and Navy Air Services

For Army Air Service

The House Bill for appropriations for the Army for the year ending June 30, 1920, was introduced by Congressman Julius Kahn, Chairman of the House Military Affairs Committee on June 7. The parts of the Bill pertaining to the Air Service of the Army follow:

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled. That the following sums be, and they are hereby, appropriated, out of any money in the Treasury not otherwise appropriated, for the support of the Army for the year ending June 30, 1920:

AIR SERVICE

Creating, maintaining, and operating at established Army flying schools, course of instruction for aviation students, including cost of equipment, and supplies necessary for instruction and subsistence of students, purchase of tools, equipment, materials, machines, textbooks, books of reference, scientific and professional papers, and instruments and material for theoretical and practical instruction at aviation schools; purchase of supplies for securing, developing, printing, and reproducing photographs made by aerial observers; to maintain and replace the equipment of organizations already in service; equipment, maintenance, and operation of aviation stations, balloon schools, fields for testing and experimental work; procuring and introducing water, electric light and power, telephones, telegraphs, and sewerage; purchase of stoves and other cooking and heating apparatus, kitchen and table ware, and furniture and equipment for kitchens, mess halls, officers' quarters, barracks, hospitals, and other buildings; screens, lockers, refrigerators, and all other equipment; salaries and wages of civilian employees in the District of Columbia or elsewhere as may be necessary; experimental investigation and purchase and development of new types of aircraft, and aviation engines; purchase, manufacture, maintenance, repair, and operation of airships, war balloons, and other aerial machines, including instruments and appliances of every sort and description necessary for the operation, construction, or equipment of all types of aircraft, and all necessary spare parts and equipment connected therewith.

And also for the purchase or manufacture and issue of special clothing, wearing apparel, and similar equipment for aviation purposes, $15,000,000: *Provided,* That claims not exceeding $250 in amount for damages to persons and private property, resulting from the operation of aircraft at home and abroad, may be settled out of the funds appropriated hereunder, when each claim is substantiated by a survey report of a board of officers appointed by the commanding officer of the nearest aviation post, and approved by the Director of Military Aeronautics: *Provided further,* That claims so settled and paid from the sum hereby appropriated shall not exceed in the aggregate the sum of $150,000. That no part of any appropriations herein shall be used unless all former civilian flying instructors who were dismissed on or about December 31, 1918, shall be reinstated on application to their former positions as from the date of such dismissal up to and including June 30, 1919: *Provided,* That nothing herein shall be construed to apply to any civilian flying instructor dismissed prior to December 31, 1918, for misconduct or incompetency.

And provided further, That no part of any of the appropriations made herein nor any of the unexpended balances of appropriations heretofore made for the support and maintenance of the Army or the Military Establishment shall be expended for the purchase of real estate.

Lieut. Col. Elbert J. Hall, S. C.

The Distinguished Service Medal was recently awarded to Lieut.-Col. Elbert J. Hall "for exceptionally meritorious and conspicuous service rendered in the designing of the Liberty engine, and subsequently in the adapting of the La Rhone engine to American methods of production and also in pushing to completion the American adaptation of the De Haviland plane."

Since his retirement from the service Colonel Hall has resumed his connection with the Hall-Scott Motor Car Co., San Francisco, Cal.

Salute for General Mitchell

For the first time in history for an officer in an airplane, Brigadier General Wm. Mitchell immediately on taking off at Langley Field for Washington in his pursuit plane received the regulation salute fired from the guns at Hampton Roads.

General Mitchell made a complete inspection of the premises by airplane accomplishing in twenty minutes what would ordinarily take two days. Enroute to Washington he passed through a heavy hail storm.

Fliers Decorated

The Royal Air Force Cross has been conferred on Commander John H. Towers, in command of the American seaplane squadron on the trans-Atlantic flight, and Lieutenant-Commander Albert C. Read and the other commissioned officers of the crew of the NC-4, Lieut. Walter Hinton, Lieut. E. F. Stone, Lieut. J. L. Breese and Ensign H. C. Rodd.

The Royal Air Force Medal has been conferred on Chief Machinist's Mate E. S. Rhoades.

Major-Gen. J. E. B. Seely of the Air Ministry, made the presentations in behalf of the King.

The Air Force Cross was recently conferred on Harry G. Hawker and Lieutenant-Commander Mackenzie Grieve, the British aviators who essayed the trans-Atlantic flight.

The Royal Air Force Cross is awarded to officers and warrant officers, and the Air Force Medal to non-commissioned officers and men for acts of courage or devotion to duty when flying, although not in active operations against the enemy.

Future of the NC-4

The Manufacturers' Aircraft Association has urged Secretary Daniels, in a telegram and a letter, to place the NC-4, which made the first flight across the Atlantic, in the United States National Museum as a permanent exhibit. The telegram, which was signed by F. H. Russell, president of the organization, read:

"In view of the doubt regarding the final disposal of the navy's NC-4, which made the trans-Atlantic flight, I urge you to take steps toward placing this flying boat in the United States National Museum. I feel that the Navy Department should see that the NC-4, an example of America's greatest contribution to aeronautics during the war, should be preserved."

Honorably Discharged

The following officers have been honorably discharged: Herbert E. Ives, Captain, A. S. A.; Herman G. Oliver, Second Lieutenant, A. S. A.; Edward P. Curtiss, Major, J. M. A., A. S. A.; Gilbert D. Deere, Second Lieutenant, A. S. A.; William H. Harris, Jr., First Lieutenant, A. S. A. P.; Robert C. Disque, Captain, A. S. M. A.; Edward Schoeppe, First Lieutenant, A. S. A. P.; DeWitt F. Ottman, Second Lieutenant, A. S. A. P.; Robert Steinberger, First Lieutenant, A. S. A.; Charles H. Dauphin, Second Lieutenant, A. S. A.

Dropped Letters to Mayors

Lieuts. Floyd A. Wilson, John K. McCrae, Perry W. Blackler and two sergeants made the flight, LaGrange, Ga., to Americus, Ga., 110 miles, in ninety minutes, using Curtiss JND-4's. The flight was made above the clouds, which were passed through at an elevation of six hundred feet to three thousand feet. En route letters addressed to the mayors of West Point, Columbus and Americus, from the mayor of LaGrange, were released as the planes flew over those cities.

Notes on Technical Aeronautics

Calibration of Air-Speed Meters

An air speed-indicator may be calibrated by using a whirling arm, or in a wind tunnel, but however well it may be calibrated or however carefully placed on the plane to avoid interference, it should be calibrated in actual flight before each important test.

A course should be established at least two miles long and if possible three. A calibration test should if possible be conducted at an altitude of 50 to 100 feet in order to ensure accuracy in making ground observations, therefore the course should be situated in such a field or country that the pilot may make a landing anywhere on the course in case of necessity. At each end of the course there should be clear country for about a mile beyond the actual ends of the measured course so that the pilot may attain a constant speed before passing the starting point in either direction.

When a location meeting these requirements has been selected a true course can be laid out and measured. This is done with a surveyor, a transit and steel tape, using the transit to carry the straight line ahead and to line up the chainmen who measure the actual distance with the steel tape.

When the course has been established, easily visible landmarks and sighting wires are set up at each end. Various devices have been used for sighting, such as the camera, lucida, transits, wires, etc. The camera lucida is probably the most accurate but is a very elaborate apparatus. For flights at low altitudes sighting wires are quite accurate enough. At each end of the measured course two upright standards are erected, one on each side of the course, and determining a line at right angles to the course. The standards are located about 20 feet apart and are plumbed vertical. Upper sighting wires are stretched between the two poles about 15 feet above the ground and lower sighting wires about 6 feet below the upper ones.

A trained observer must be stationed at each end of the course, capable of sighting the airplane the moment it passes over the cross wires. The observer notes this moment by ranging in the two wires until they coincide as shown in the photograph.

A telephone is established between the two ends of the course. As the airplane approaches the starting end, the observer at that end warns the one at the other end, and as the plane crosses over the starting wires, he calls time and starts his stop watch. The other observer starts his watch at the same time. When the plane crosses the finish line, the same signal is given, this time by the second observer and both men stop their watches. This method causes a slight error due to reaction time, for the man at the finish of the course starts his watch late, while the observer at the starting end stops his watch late. The mean of the two records can be taken as reasonably accurate however.

Ground observers should be provided with suitable forms for the entry of their observations from which mean readings are taken.

The test should be conducted at as low an altitude as possible, preferably 50 feet, and should be made early in the morning or in the evening when the weather is most likely to be calm. The velocity of the wind should not exceed 5 m. p. h. and the direction and velocity of the wind should be observed from the ground anemometer.

The calibration should be carried out at a number of different speeds—the maximum speed, the minimum speed consistent with safety and several intermediate speeds. At each speed there should be two trips each way or four trips in all.

The following instruments are required on a test:

a. A statoscope to assist in maintaining a constant level; this is indispensable.
b. An altimeter.
c. A tachometer.
d. An air speed meter.
e. A strut thermometer.

Although other instruments may be required for the actual flying of the ship.

The correlation of the altimeter readings for temperature, the correlation of results, allowances for wind speeds, etc., are matters of some difficulty, and the carrying out of the test itself requires considerable skill on the part of pilot, flying observer and ground observers, but without a careful calibration no performance test is of any value.

The Principles of Aerial Photography

Aerial photography has during the war proved itself to be one of the most valuable adjuncts of reconnaissance. It will certainly be utilized in peace time, for interesting news photographs, for agricultural surveys and many other purposes. A whole, complicated technique of aerial photography has grown up, and there have been produced a number of very valuable cameras specially adapted for aerial work. It is interesting to review the fundamental principles of this important branch of aeronautics.

All aerial photography is carried out at such heights above the ground that the distance may be regarded as infinite, and it is on this account that the focus of an aerial camera is set and fixed so as to be correct for objects at infinity. This ensures that all photographs taken by the camera from the air shall be accurately in focus and provided the exposure is correct, produces the best results. The height from which a photograph is taken depends largely on the size of the field and the amount of detail required. In general the photographs are taken from a medium height of 6,000 to 9,000 feet, but in exceptional cases they are taken at a great altitude.

It would appear at first sight that as an airplane moves so rapidly over the ground, a very short exposure would be necessary to secure a sharp photograph. But this is not the case and to an observer at a reasonable height, the ground appears to crawl past very slowly, so that a particularly short exposure is not necessary.

The limiting factor is engine vibration, which will not permit of an exposure longer than 1-100th. of a second being made with any certainty of sharpness. In gliding flight where engine vibration is absent longer exposures have been made with success. As a rule the question of exposure is definitely settled before a flight.

Any good camera may be used in aerial photography, but certain specific aeronautic improvements have been introduced to simplify, keep down the weight and make the instrument as fool proof as possible. The ordinary bellows form of camera cannot stand the rough handling which cannot be avoided in the air, and it has been found necessary to introduce a box camera which is strong and rigid, and cannot be put out of adjustment readily.

The body of the camera may be of wood or metal, and is usually blackened on the interior to prevent the reflection of any light from the sides onto the sensitive plate. It may be rectangular in section or tapered towards the forward end. The size of the camera depends upon the particular object for which it is employed and the length varies

The lens being the most important part of the apparatus, it is essential that it should be of the very best quality, and it is also desirable that it should have as large an aperture as possible. A large aperture of the lens admits of a shorter exposure being given, which is of particular advantage in dull weather, and it is customary for the aerial photographer to set the lens at its maximum aperture, reducing the exposure instead of the aperture when the ilght increases in brightness.

A compartively short focus lens is usually fitted for aerial work. The focal length determines the angle which is subtended at the nodal point of the lens by the sensitive plate, and by employing a lens of double the focal length the dimensions of the field of view are increased in the same ratio, while the area is increased fourfold.

The hand camera usually employed for aerial work has a focal length of about 8 inches and with a plate 5 inches by 4 inches takes in a field of view given by the following table:

Height in Feet	Length in Feet	Width in Feet
500	312	250
1,000	624	499
2,000	1,248	998
5,000	3,120	2,495
10,000	6,240	4,990
15,000	9,360	7,485
20,000	12,480	9,980

In order to regulate the time of exposure some type of shutter is employed. The shutter is simply a horizontal slit which passes across the surface of the sensitive plate from top to bottom, the exposure being varied by adjusting the slit width.

In order to secure the most useful result, it is desirable to use plates in preference to films for aerial work, the chief advantage being that the plate presents an absolutely flat surface which can be accurately focused upon, giving a picture which can be enlarged with good results. Films, however, are far more convenient in the air, and a much greater number can be carried in the machine, while plates unless carefully stowed are apt to be broken by a bumpy landing, and are too heavy to be carried in large numbers.

In order that the photographer may be enabled to photograph any particular object, a view finder is provided for and fitted to the camera, which shows exactly what will be reproduced on the sensitive plate at any time.

A Quadraplane

During the war, when the very fast single-seater scout was very much in demand, and the question of visibility was paramount, an English machine was produced to attain this object by the use of the quadruplane, which gave the advantage of a very narrow cord. Two views of this are shown herewith. This was known as the Armstrong-Whitworth type F.K.-10, equipped with a 130 rotary engine. The stagger is very pronounced, while the second plane passes across some little distance above the top of the fuselage. The third and fourth plane pass under the top of the fuselage and obstruct the view very little. No stabilizer was used, but a very large elevator. It was found that the machine was not very good to fly, and from the performance figures it is seen that this particular quadraplane, though an interesting experiment, does not compare favorably with the orthodox biplane or monoplane. The following is main data for this machine:

Overal length, 22 ft. 3 in. Span, 27 ft. 10 in.

Chord, 3 ft. 7 in. Total wing area, 398.4. Gap, 2 ft. 8 in.

Stagger, 1 ft. 5 in. Dihedral, 1½ deg. Aileron area, 67.2 sq. ft. Area stabilizer, none. Elevators, 16 sq. ft. Area fin, 1.9 sq. ft. Rudder, 8 sq. ft.

Engine, R. A. F. C., 130 hp. Weight of machine empty. 1250 lb. Loaded, 1860 lb. Speed at ground level, 105 m.p.h. Climb to 10,000 ft. in 17 min. Load per square foot, 4.5. Load per horsepower. 13.9. *Flight, April 3, 1919.*

The World's Airplanes and Seaplanes—Nieuport Scout Type 17—Thomas-Morse Scout MB-3

Group 1, No. 5.—The Thomas-Morse Single-Seater Scout MB-3

The Thomas-Morse scout MB-3 had the distinction of being one of the fastest machines in existence. Equipped with a 300 hp. Hispano-Suiza motor, with excellent streamline and low weight per horsepower it is able to maintain a very high climb and also high speed in horizontal flight, while its sturdy construction permits violent manoeuvers.

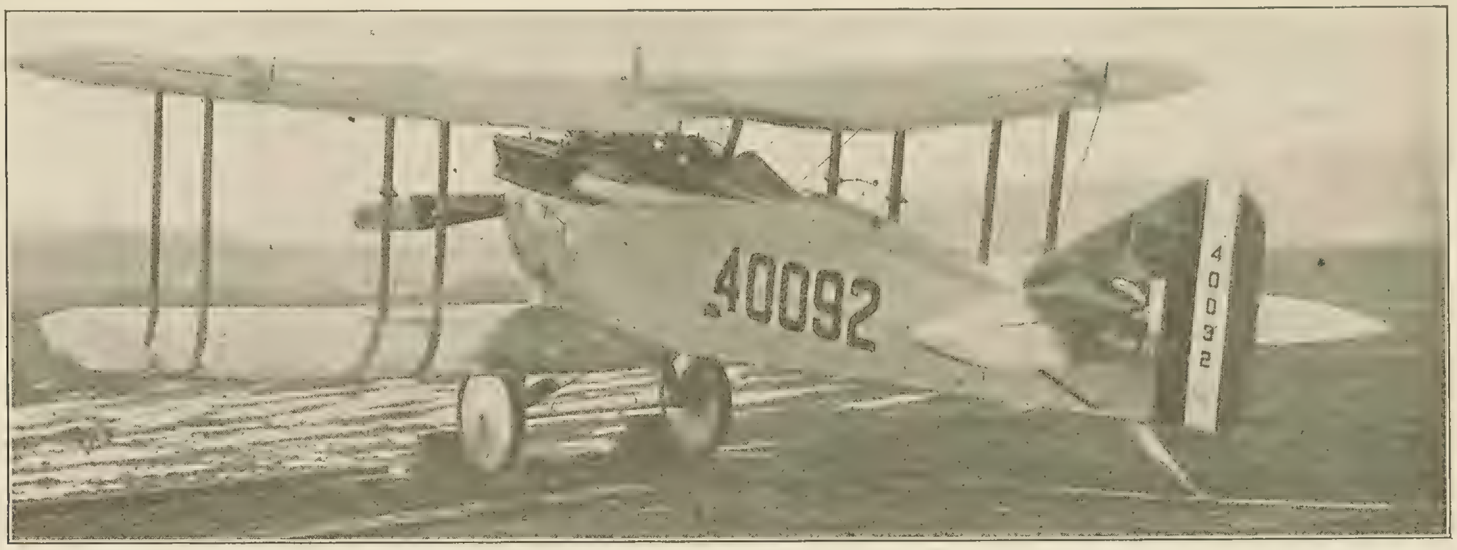
Area of wings (upper and lower) 250 sq. ft.
Gross weight of machine 2,050 lbs.
Wing loading 8 lb./sq. ft.
Power loading 6 lb./hp.

PERFORMANCE

High speed 163.68 m.p.h.
Initial climb 1,000 ft. in 20 sec.
10,000 ft. in 4 min. 52 sec.

its requisite strength. The forward portion of the body is of partial streamline section, which is further enhanced by a streamline nose ending in the airscrew. At the pilots compartment conventional rectangular construction of particularly deep section is used. Ailerons are fitted to the upper wings only; the radiator is disposed in the upper wing.

Two Browning machine guns, synchronized with the airscrew are mounted in front of the pilot.



The Thomas-Morse Scout MB-3

POWER PLANT

Hispano-Suiza motor model H.
340 hp. at 1900 r.p.m.
Fuel capacity, sufficient for 3 hr. at full power at 10,000 ft.

MAIN DIMENSIONS

Span 26 ft.
Chord 5 ft. 3 in.
Overall length 19 ft.

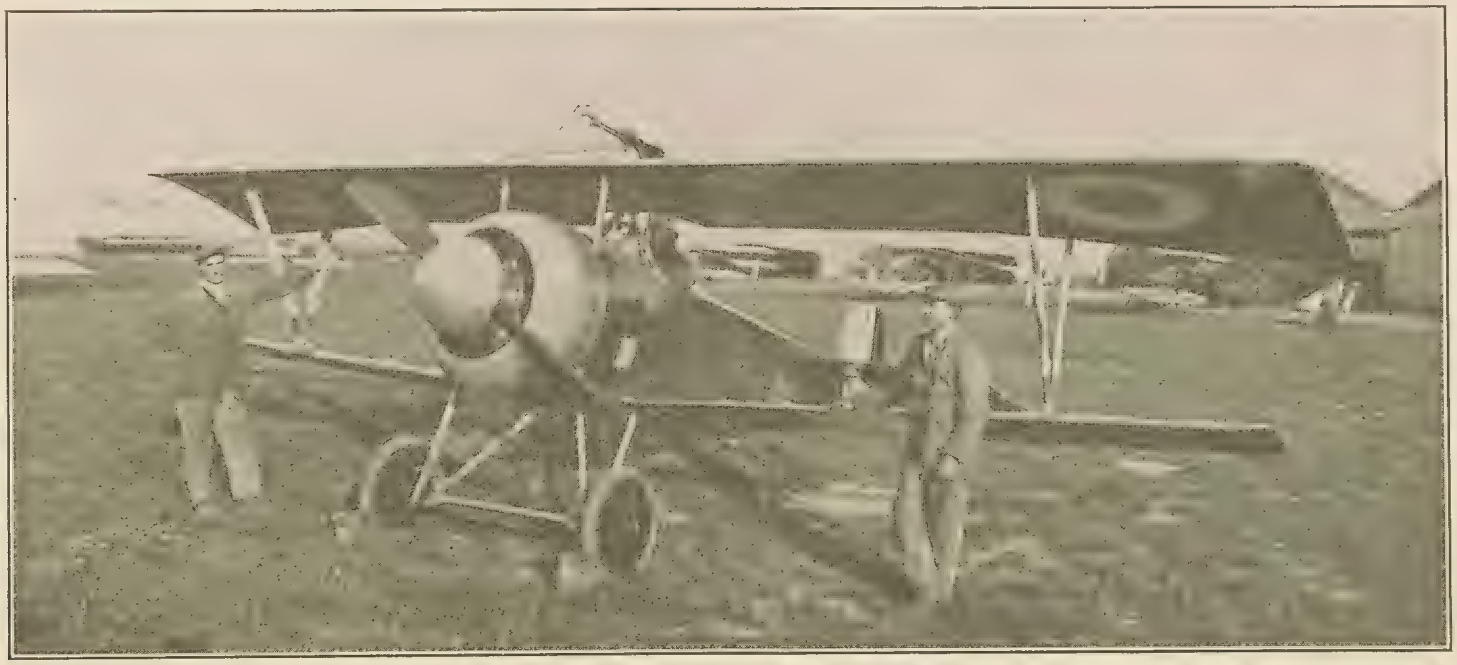
STRUCTURAL FEATURES

In order to attain high speed in the MB-3 every effort has been made to provide the most effective streamlining throughout this machine; the bracing wires are all of streamline section. The body is of conventional construction, with the exception of tie-rods replacing piano wires and turnbuckles. The engine section is built up almost entirely of three ply, the engine bearers and supports being of this construction, which is exceedingly light for

Group 1D.—The Nieuport Scout Type 17

At one period of the war, the Nieuport Scout with the 110 h.p. Le Rhone, was in spite of its comparatively low power, the fastest machine on the Western Front, the rotary motor allowed weights to be concentrated and the result was an extremely manoeuvrable machine, which could out fight even speedier machines when these were developed by the Germans. The small lower wing

(*Continued on page* 14)



The Nieuport Scout-Type 17

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Formerly Air Service Journal

Air Impotency

CUTTING down the Army and Navy appropriations for aviation to $15,000,000 for each service by the House Military and Naval Affairs Committees means, unless the Senate replaces some of the desired amounts, making the United States impotent in the air, crushing the airplane industry, and scrapping all experimental development begun during the War.

The argument that these sums are enough to "keep the services going" until a reorganization of the Army and Navy takes place is so fallacious that it should controvert itself. The Army needs $31,000,000 for airplanes and engines alone. Without this equipment there is nothing to "keep going," because all combat machines in service now would be obsolete against a first-class air power. Just to have the officers and men is worse than a waste of government money.

If money were appropriated now for the purchase of equipment which will take about a year to build, then when the Air Services are consolidated, reorganized or left as they are, this country would at least have some protective aircraft.

The whole situation is clearly an effort to force on the country a united Air Service. Whatever arguments may be made for and against a single independent Air Force, they should be free from appropriation coercion and rest solely on their own merits.

America's "splendid isolation," viewed in the light of recent aeronautic achievements, soon will be only a memory. A country that is less than a day distant from Europe and Asia cannot well rely upon the Atlantic and Pacific oceans for protection in time of stress. No longer can the Congress of the United States ignore the fact that if we are to maintain our independence and position as a first-class nation we must have aircraft inferior to no other government. If the predominating idea on Capitol Hill is to reduce this country to the level of China, or Korea, no fault can be found with the policy now being pursued—but the plan of spending one billion dollars, too late to be of use, rather than one hundred millions, when advantage may be taken of the vast expenditures for aviation already made, will appeal to few persons outside of the House of Representatives.

Non-Stop Across the Atlantic

THE one feat which ever since the inception of aviation has appeared as the supreme goal and final consecration of mechanical flight, the crossing of the Atlantic in a non-stop flight, has at last been accomplished. What Hawker and Grieve admirably failed to achieve, two other fliers, Alcock and Brown, one an Englishman and the other an American, succeeded in carrying out without a hitch, thus winning imperishable fame for themselves.

The marvelous performance these daring pioneers of the air have set up by crossing the Atlantic from St. John's, N. F., to Clifden, Ireland, in fifteen hours and fifty-seven minutes—in less time that it takes the fastest railroad train to go from New York to Chicago—establishes a new world's distance record for airplanes, which exceeds by over 500 miles that established by Commander Read in his memorable flight from Trepassey to Horta.

The unexpected high rate of speed at which the Vickers Vimy-Rolls traveled across the Atlantic, covering 1936 land miles at 117 m.p.h., was due to a strong following wind, for the high speed of the airplane was given by the manufacturers as 100 m.p.h., and the proposed cruising speed was not to exceed 90 m.p.h. This favorable circumstance accounts for the fact, disclosed by Alcock after landing, that the Vimy-Rolls consumed only two-thirds of her fuel supply in crossing the Atlantic, for as the designed cruising endurance of this machine was 2440 miles the above fuel consumption in a deal calm would have sufficed for some 1800 miles only.

Excepting this important factor to the credit of the weather, atmospheric conditions were decidedly unfavorable throughout the journey, for the aviators had to fly for hours without seeing the heavenly bodies, and dense fogs often compelled them to descend close to the sea. That the navigator, Lieutenant Brown, should have been able to satisfactorily get his bearings and give the pilot the correct course despite these difficulties fittingly illustrates the qualities of his seamanship, which thus shares with Captain Alcock's hardihood in sticking for sixteen hours to the controls and skilful piloting the credit for the success which crowned this great enterprise.

What Is the Landing Speed?

IN the comparative study of airplanes built for the same purpose, in the writing of specifications, in the designing of machines to meet certain specifications, this difficulty always presents itself—what is the landing speed?

From the loading per square foot and the wind tunnel characteristics of the wing section, it would seem fairly easy to predict the lowest possible speed in the air; but the correctness of any calculations made to this end are invalidated by the fact that each wing truss has to have a different correction coefficient applied, to meet varying conditions of stagger, gap chord and so forth. The full scale correction is still shrouded in obscurity. The effect of the propeller stream on the lift of the wing is a little uncertain. The personal equation of the pilot enters into the matter. One pilot may be able to keep the machine steadily at the right angle; another may have to fly several miles faster than the possible minimum.

But even more difficult to determine than lowest air speed, is the landing speed. This depends even to a larger extent on the skill of the pilot, the way he recovers from a dive, the angle at which he sets his machine down. Not only is it possible for two pilots to obtain varying landing speeds from the same machine, but there is no method developed for recording or measuring the landing speeds.

It would seem as if this were one of the most important practical problems to engage the attention of aeronautical engineers.

Flying Fields and Politics

THE part of the Army appropriation bill prohibiting the use of any money for the purchase of land is a serious blow to the development of a comprehensive aeronautical program for the Air Service. While it may have been true that in certain instances high prices were asked for land for flying fields, it is not likely that the cost will come down when it will require political influence to put through a separate bill for its purchase. This clause will mean throwing all the plans of the Air Service regarding the retaining of fields permanently into politics with all the attendant evils.

Around the World Flight

THE projected flight of the Martin Bomber, piloted by Captain Roy Francis across the continent in two hops is likely to be only the preliminary of the final achievement of aeronautical genius—the around the world flight.

First Honors For Vickers-Vimy-Rolls

(*Continued from page* 3)

wonderful piece of navigation and all the more remarkable when one considers the weather conditions. A great part of the time the horizon and sky must have been hopelessly obscured. While Clifden is only sixty miles from Galway, it is not more than ten miles off the course. They did a sensible thing when they saw land and got down on it. This great feat of navigation is just what you would expect of Brown.

Describes Compass That Brown Used

"An interesting controversy will probably arise between the two schools of aerial navigation: One holding to astronomical observation and the other to directional wireless. Brown was using the system of astronomical observation combined with compass flying, which he worked out himself. He had a compass with a rotary ring enabling him to take compass bearing of the sun, moon or stars. We got this instrument for him only at the last minute. Its technical description is a liquid compass fitted with azimuth sights, suitable for taking observations from the hand for aerial navigation.

"It was made in the shortest possible time by Kelvin, Bottomly & Baird of Glasgow. If this compass was as he believed, it would be of material assistance to Brown. The flight will revolutionize aerial navigation. No one has navigated so accurately before."

1936 Land Miles

The flight must be regarded as a splendid demonstration of Lieut. Brown's ability as a navigator. The voyage ended exactly where Brown said it should. It is apparent that the plane was held throughout to the Mercator course that Brown had charted. "We'll head for Galway Bay," he said, "and when we get there we will hang our hats on the wireless towers at Clifden."

It is apparent also that the flight worked out in distance almost exactly what had been figured. The estimate was that it would be 1,650 nautical miles. Allowing ten for manoeuvring that was necessary before the battle with the winds was over at the Newfoundland end of the course, the actual distance covered was 1,936 land miles, with a flying time of a little over sixteen hours. This means an average of about 117¼ miles an hour. Of this speed between twenty-five and thirty came from the wind which favored the plane the entire distance.

Sorry Sextant Did Not Come

Brown was deeply regretful that he was not able to take with him the Byrd bubble sextant loaned for use on the voyage by the United States Navy Department. Brown talked over with Lieut. Commander R. E. Byrd, Jr., who devised the sextant, problems of the flight, and, as a result made a formal request for the instrument. It was started to him but not in time to arrive before he got away. "I'm awfully sorry I didn't have it," he said, "because it is a wonderful instrument." Both Alcock and Brown mean as soon as possible to visit the United States. When Brown comes it will be to stay as a practising electrical engineer, as his plans now are. He is proud of his American citizenship and wants to establish a residence in the country to which he owns allegiance.

Division of the Prize

There is an odd nickle or perhaps what may prove to be an odd sixpence of the *Daily Mail* prize money to be divided between Alcock and W. Brown. No basis of division between them had been arranged before they left for England, but the presumption was that two-thirds would go to Alcock and one-third to Brown. Every minute of the 919 they spent in the flight represented $50.50, of which $33.67 went to Alcock and $16.83 to Brown. This amounted to $2,020.20 an hour for Alcock and $1,010.10 for Brown. The total for Alcock on this basis would be $33,333.30, and for Brown $16,666.65. This leaves an odd 5 cents.

The "Vickers-Vimy-Rolls"

The construction of the Trans-Atlantic "Vickers-Vimy-Rolls" was completed at the Weybridge Aeroplane Works of Messrs. Vickers, Limited.

This aeroplane is practically similar in every respect to the Standard "Vimy" as supplied to His Majesty's Government.

Two standard 350 hp. Rolls-Royce engines are installed. The capacity of the petrol tanks has been increased to 865 gallons, and the lubricating oil tanks to 50 gallons, and with this quantity of fuel this aeroplane has a range of 2440 miles. The maximum speed is over 100 miles per hour. The span of the "Vickers-Vimy-Rolls" is 67 feet, and overall length 42 feet 8 inches. The width of the planes is 10 feet 6 inches. A wireless telegraphy set capable of sending and receiving messages over long distances was carried, and the pilot and navigator wore electrically heated clothing.

Capt. John Alcock, D. S. C.

The pilot, Capt. John Alcock, D.S.C., was born at Manchester in 1892, and received his technical engineering education at the Empress Motor Works at Manchester. He became interested in Aviation in its early days, and adopted it as a profession. He took the Royal Aero Club's Flying Certificate at Brooklands in 1912, and rapidly rose to the head of his profession, taking part in a large number of the early competition flights, amongst others the well remembered race London to Manchester and return in 1913, in which he secured second place.

At the outbreak of war he immediately joined the R. N. A. S., and was posted to Eastchurch as an instructor. Later he became the chief instructor of the Aerobatic Squadron. He did valuable work on the Turkish front where he won the D. S. C., and held the record for long distance bombing raids. He was eventually taken prisoner by the Turks owing to an engine failure, and remained as such until the end of the war.

Alcock Gets Across!

And AIRCRAFT JOURNAL of all aeronautical publications carries the first complete story of the flight

First Again!

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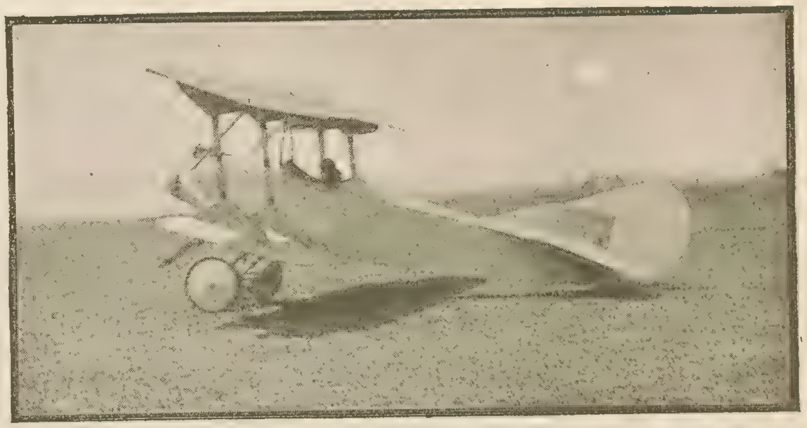

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Lieut. Arthur Whitten Brown, R. A. F.

The navigator, Lieut. Arthur Whitten Brown, A.M.I.E.E., M.I.M.E., A.M.F.A.I.E., was born in Glasgow in 1886, and his parents were American citizens He is an engineer by profession, and received his practical training with the British Westinghouse Company, which is now allied with the Vickers Company. He received a thorough knowledge of surveying, and being interested in Aviation, naturally devoted study to aerial navigation as applied to surveying. He enlisted in the University and Public Schools Corps in 1914, later receiving a commission in the Manchester regiment, and served with the 2nd Battalion in France during 1915. He then transferred to the Royal Flying Corps as an observer, and was wounded and taken prisoner of war in the same year. He was later interned in Switzerland, and repatriated in December, 1917, since which time he has been engaged with the Ministry of Munitions on the production of aero engines, and has put in a considerable amount of flying at home stations. He is also a pilot of some experience, and has flown many types of machines.

On coming of age Lieut. Brown claimed American citizenship, still retains it, and has no intention of relinquishing allegiance to the Stars and Stripes. He is a member of the Royal Air Force.

Congratulations from Washington

Whole hearted congratulations for the fliers and prediction that the event will go far toward popularizing long distance flights characterize the comment made by officials in Washington on the completion of the first non-stop trans-Atlantic air voyage.

"It was a wonderful feat," said Secretary Daniels. "I congratulate Capt. Alcock and rejoice with him. His flight is indicative of the great things that are ahead in aviation."

Rear Admiral David W. Taylor, chief naval constructor, who is conceded to have been the father of the definite plan to cross the sea in an airship, also expressed his admiration of the pluck of the two British aviators.

"I am heartily glad they made it," Admiral Taylor declared.

"It means that long distance flying will become immediately more popular and we can expect other record making trips."

General Menoher Jubilant

Gen. Menoher, Chief of the Air Service, United States Army, said:

"I am very glad they have succeeded. There is only one thing that can be said on such an occasion and that is 'hurrah!' It is a great achievement when a bomber can fly across the Atlantic inside of a day and a night. It shows that Hawker had the right idea. The only trouble with his flight was that he had the element of bad luck in mechanical difficulty which forced him to bring his plane down. The element of luck was with Alcock and Brown in that they did not have difficulties of that sort.

"The flight of the Vickers-Vimy machine on top of the splendid performance of the NC-4 shows that the plan for the spanning of the Atlantic by air was feasible from the start. As soon as I reach my office to-morrow I will cable my personal congratulations to the two British fliers."

Representative Kahn (Cal.), chairman of the House Committee on Military Affairs, said: "It is a great feat and America will congratulate the Englishmen on their splendid flight. Our own aviation service will be the first to acclaim the achievement of these men. But our own airmen are going to better that record. I do not doubt the ability of Americans to make the same trip in even shorter time. We will hear from our own countrymen in the near future."

"And All That Sort of Thing"

Harry G. Hawker is credited by the Central News as saying with regard to Capt. Alcock's achievement:

"It was a magnificent and very fine feat. I am very glad Capt. Alcock was able to make the flight in real fashion without warships and all that sort of thing. It is very gratifying from that point, indeed."

Extra Pay for Cadets

On June 10 in the Senate of the United States Mr. Chamberlain introduced the following bill, which was read twice and referred to the Committee on Military Affairs. It provides for extra pay for cadet avitors:

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, that the following sum, or so much thereof as may be necessary, is hereby appropriated, out of any money in the Treasury not otherwise appropriated, for the support of the Army for the fiscal year ending June 30, 1919.

AIR SERVICE (AERONAUTICS)

For extra pay at the rate of $42 per month in addition to their pay as privates, first class, which is payable from the appropriation for "Pay of the Army," to all candidates for commission in the Air Service (Aeronautics) while receiving instruction involving flights in any type of aircraft for the period beginning July 1, 1918, and ending June 30, 1919, $4,152,200.

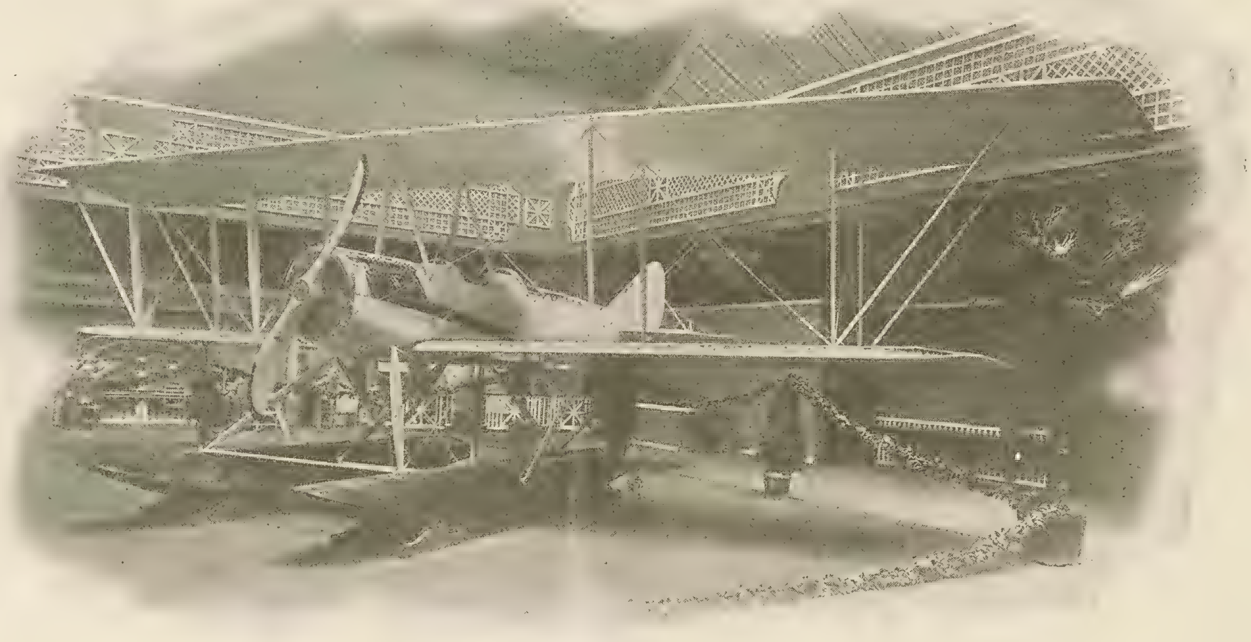
Casale's New Record

Adjutant Casale, the French aviator who established a new world altitude record of 31,168 feet last week, broke his own record June 14 by ascending in his airplane to a height of 10,100 metres (approximately 33,136 feet).

The flight was made in fifty-five minutes. The temperature at the high point was eight degrees below zero.

Fliers Home from Brazil

The Lamport & Holt liner Vasari from Buenos Ayres, Rio and Barbados, brought two young American aviators, Lieut. P. A. Cusacks of Hempstead and Lieut. O. B. James of 70 East Seventieth street, New York, who have been in Brazil fourteen months establishing a flying service for the Brazilian navy. They were sent to Rio by order of the Secretary of the Navy.



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COLLEGE POINT, L. I.

The design and production of commercial aircraft and the construction of flying fields and airdromes with complete equipment are only a few of the many details in connection with commercial aviation which our staff of engineers can intelligently handle.

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52 Vanderbilt Avenue, New York, N. Y.
F. G. DIFFIN, *Pres.* R. U. CONGER, *Vice-Pres.*

Bailey, Banks & Biddle Company
PHILADELPHIA

Have Been Appointed Official Jewelers for the Following:

Society of Cincinnati
Society of Sons of the Revolution
General Society of War of 1812
Aztec Club of 1847
Military Order of the Loyal Legion of the United States
Military Order of Foreign Wars of the United States
Naval Order of the United States
Society Army of the Potomac
National Society of the Daughters of the American Revolution. Charter members' and officers' insignia
Society Army of the Cumberland
Order of Indian Wars of the United States
Society Veterans of the Indian Wars
Naval and Military Order of the Spanish-American War
Society Army of Santiago de Cuba
Army of Philippines
Society of the Porto Rican Expedition
Military Order of the Dragon
Military Order of the Carabao
The Society of Manila Bay
Military Order of Moro Campaigns
Order of the White Crane
Order of the Founders and Patriots of America
Order of the Descendants of Colonial Governors
Society of Colonial Wars
Order of Runnemede (Magna Charta)
Medal of Honor
The Veteran Corps of Artillery of New York (The Military Society of the War of 1812)
National Society of the Colonial Dames of America
Society of Daughters of the Cincinnati
Order of the Crown
Colonial Society of Pennsylvania
Pennsylvania German Society
Medal Commemorative of the Centennial Anniversary, 7th Regiment, National Guard, State of New York
Centennial and Memorial Association of Valley Forge
Jefferson Davis Monument Association
Military Order of the Midnight Sun
Order of Washington
Order of St. George of the Holy Roman Empire
United States Military Academy
United States Naval Academy
Union Society of the Civil War
Descendants of Signers
National Society of Patriotic Women of America
Navy League of the United States
Military Order of the Serpent
Society of the Ark and the Dove
Society of Americans of Royal Descent
The Huguenot Society of America
The Daughters of Holland Dames
Military Order of the Orient
Order of Colonial Lords of Manors in America

Thomas

THOMAS-MORSE AIRCRAFT CORPORATION
CONTRACTORS TO THE U.S. GOVERNMENT
ITHACA, N.Y. U.S.A.

Tests of U. S. Army Airplane Chutes

(*Continued from page 4*)

1. In level flight, or 60 degrees above or below level flight, and at 500 feet or more, close throttle or cut switch, put hand in pull ring and jump or dive over side, pull rip cord as soon as leaving plane, but not *before;* or climb back to empennage or out on one wing far enough to clear horizontal stabilizer—usually about the first strut—pull rip cord, and the chute should pull the aviator off with a loss of altitude less than 50 feet. With small airplanes it is believed that it will be impracticable to climb out on a wing as that wing would instantly fall, but with larger planes this maneuver may be practicable if performed quickly.
2. When at altitude less than 500 feet and more than 100, get in one of positions outlined above, out on wing or on empennage, and pull rip cord.
3. From nose dive, if possible to be in position at more than 100 feet altitude, out on one wing or on empennage, as before stated.
4. From spinning nose dive, out on empennage.
5. In any case, if near the ground, back on empennage.

Compulsory fitting of life-saving parachutes to all airplanes of the Royal Air Force of Great Britain has been decided upon by the Government. Whether this will be applicable also to commercial aircraft has not yet been settled.

Chicago-Cleveland Mail

The Chicago-Cleveland Air Mail Service during its first half month has made a daily 100 per cent performance except two half trips, May 21, when the field at Bryan, Ohio, was so flooded that the planes could not rise from the ground.

Out of a possible mileage of 11,050, a total of 10,725 was run, making a performance of 97 1/10 per cent. A grand total of 408,560 letters were carried in the first half month of this service.

Many Schools Opening

With the raising of the ban on civilian flying—a war measure adopted by the government a year ago—many aviation schools are again opening throughout the country.

This week marked the opening of the Curtiss Aviation School at Garden City, L. I., under the direction of Roland Rohlfs, test pilot for the Curtiss Engineering Corporation, and Richard H. Depew, until recently a captain in the United States Air Service.

Inquiries which have been coming in since the time of the signing of the armistice reveal the fact that, unlike pre-war days, the applicants are, most of them, interested in the commercial side of aviation.

More than 200 applications have been received from all parts of the United States, as well as Canada, Mexico, Argentine, Cuba and Italy. The first student to enroll in the school is Alberto Chiesa of Milan, Italy, who has come to America to receive instruction in flying.

Rohlfs, who has been instructor and test pilot for the Curtiss Company, has had more than 2000 hours in the air, and during his career as a flier he has flown all the Curtiss models—both land and water—including the new three-passenger Oriole, the record-breaking Model 18-T triplane which was designed especially for war purposes and which has since been modified for peace-time flying, and the new Curtiss mail, machines.

Depew, who was a flier for the Curtiss Company before the war broke out, was a test pilot at McCook field, Dayton, O., while in the Air Service of the U. S. Army.

The course to be offered will differ from the methods used by the army. Instead of the three months' ground school course, followed by several weeks of actual flight, it is the aim of the instructors to teach the principles governing flight simultaneously with actual flying. The course will include lectures on aerodynamics, theory of flight, construction and repair of airplanes and motors. Following the lecture, the student will be taken up into the air and taught to apply his theories.

"I have found that there is a keen desire on the part of a large number of people to fly," said Mr. Depew, who will have charge of the enrollment. "What impressed me most was the number of applicants who are planning to take up aviation as a commercial proposition. Most of the applicants are young men who plan to make aviation a life vocation, the same as men who went into the automobile business a few years ago. Others are men who were in the Air Service and who had covered the ground school course, but who were unable to get actual flying on account of the signing of the armistice and the subsequent demobilization of the army. There are still others who are taking it up for the sport of the thing, and, in addition, there are a number who desire to get into the aerial mail service."

Before the outbreak of hostilities, Curtiss schools were in operation at Miami, Fla., Buffalo, N. Y., and Newport News, Va. When the United States entered the war, there was a great demand for experienced fliers to take charge of instruction of embryonic army pilots and the schools were closed. The field at Miami was turned over by the Curtiss Company to the United States marines and is still operated by them. Most of the pilots stationed at the schools flocked into the service and became civilian instructors.

Among the well known fliers who were instrumental in teaching flying to the first batch of army and navy aviators were Victor Carlstrom who made many famous long distance flights, Lawrence Leon, Victor Vernon, S. W. Cogswell, Carl Batts, who held the American record for loops, and who is now flying Curtiss boats in the Scandinavian countries, Walter Lees, James Johnson, Eddie Stinson, one of America's most famous acrobatic fliers, Andrew Hermance, Roger Jannus, Roland Rohlfs, Joseph Bennett, Harold Kantner, W. H. Spratt, who saw service as a British pilot in the early days of the war, Augustus Koerbling, Richard Depew, and Lester A. Patterson.

Many of the foremost fliers in the world received their early instruction at the Curtiss schools.

THE AEROMARINE PLANE AND MOTOR COMPANY

Will Specialize in Filling the Individual Requirements of

THE UNITED STATES
ARMY AND NAVY

—and—

PRIVATE INDIVIDUALS

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Factory—Keyport, N. J. New York Office—Times Bldg.

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When Other Propellers Failed

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The new Paragon Booklet, Technical and Historical, free for the asking.

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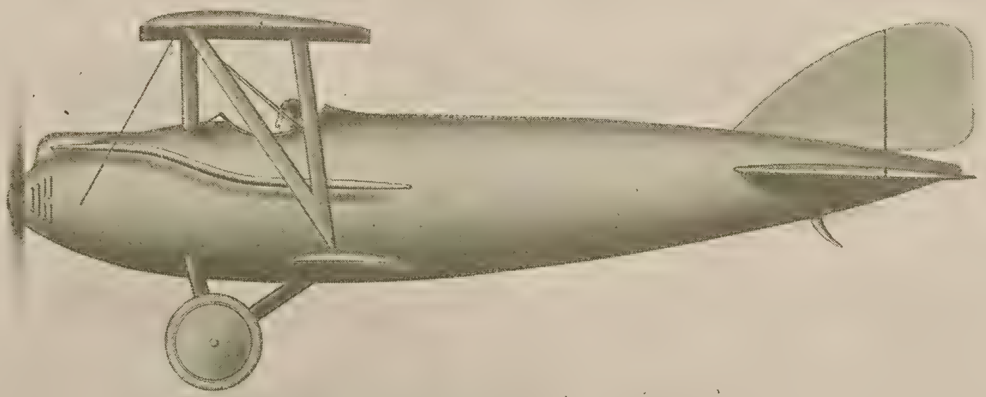

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Price $2500, F.O.B. Factory

Cost of Operation Approximately One Cent Per Mile

LOUGHEAD AIRCRAFT MANUFACTURING COMPANY
SANTA BARBARA, CALIFORNIA
Contractors to the U. S. Navy

World's Airplanes and Seaplanes

(Continued from page 7)

provided excellent downward vision, and the cut out in the upper wing gave good view above.

Power Plant

Le Rhone, 110 horse power, 9 cylinder rotary motor.

Weight with propeller, 370 lbs.

Fuel consumption, .7 lbs. per horse power per hour.

Oil consumption, .1 lb. per horse power per hour.

Main Dimensions

Span (upper wing)	27 ft. 6 in.
Span (lower wing)	26 ft. 6 in.
Chord (upper wing)	4 ft. ½ in.
Chord (lower wing)	2 ft. 4¾ in.
Over all length	18 ft. 3 in.
Over all height	8 ft. 9 in.
Sweep-back	4 degrees
Dihedral (upper wing)	3 degrees
Dihedral (lower wing)	5 degrees
Area of main planes (with ailerons)	168.10 sq. ft.
Area of upper wing (with ailerons)	115.06 sq. ft.
Area of lower wing	53.04 sq. ft.
Area of ailerons (2 on upper wing only)	15. 6 sq. ft.
Area of stabilizer	12. 2 sq. ft.
Area of elevators (2)	17. 8 sq. ft.
Area of rudder	8. 8 sq. ft.

Weights

Weight empty	860 lbs.
Fuel and oil	194 lbs.
Military load	286 lbs.
Total weight	1,340 lbs.
Weight per sq. ft.	8.0 lbs.
Weight per horse power	12.1 lbs.

Performance

Altitude (ft.)	Speed (M.P.H.)	Time
Ground	110	
3,300	—	4 min.
6,600	—	7 min.
9,900	—	11 min.
13,200	—	16 min.

Structural Features

The most interesting structural feature of the Nieuport is the use of a "V" strut for interplane bracing. It affords a very rigid construction with light weight and little resistance.

The fuselage is well steam lined, and is of square section. A spring tail skid is used.

Exhibition in Holland

The first international exhibition of aircraft in Holland will be held in Amsterdam during the entire month of August. The exposition is sponsored by the Chambers of Commerce of Amsterdam and Rotterdam, under whose auspices it is held, while the Netherlands Government has accorded its official sanction.

The exhibition will be complete in every detail of aeronautic activity, comprising fifteen sections that cover the field with thoroughness. Demonstrations will form a prominent part of the exhibition, different types of machines participating in tests of commercial and passenger-carrying possibilities, as well as showing advanced forms of acrobacy.

A number of lectures are on the program for the exhibition, and the addresses to be delivered will include such subjects as aerial navigation, airplane construction, aerodynamics, meteorology, materials, aerial photography, wireless telegraphy and telephony, etc.

In view of the interest Holland displays in establishing aerial commercial services with neighboring countries and her vast colonial domains in the Far East, it is expected that the exhibition will greatly stimulate the inauguration of aerial transport lines. The large number of Government and commercial interests supporting the exhibition is encouraging for its success.

Several manufacturers of the principal Allied nations have already declared their intention of participating in the exhibition, and indications point to a goodly representation of American manufacturers. The secretary for the exposition in the United States is J. C. Ankersmit, at 17 Battery Place, New York.

Wrote Story During His Flight

En route from Chanute Field to Chicago a newspaper correspondent wrote on a small typewriter full account of the trip; a flight of 110 miles was made in 75 min.; pilot, Lieutenant James W. Welch, A. S. A.; airplane, Curtiss 4-H. G.

NO CARBON-MORE POWER-LESS FUEL Price 50c. up
"NO-LEAK-O" ONE PIECE OIL SEALING NORWOODS PISTON RING TOP OIL SEALING GROVE
On market 5 years. Over 5,000,000 in use. Every set guaranteed. Popular thru service. Don't rebore cylinders. "NO-LEAK-O" makes good when others fail. Made different. Give results no other ring can. Write for booklet. Order from nearest Jobber, or write direct.
NO-LEAK-O PISTON RING CO., Baltimore Md.
Refer to Section 10

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Rates, 25 cents per agate line per insertion. Black face type, 50 cents per agate line. Forms close Saturday preceding date of publication.

FOR SALE—10,000 turnbuckles; one new and one used two-seated biplanes with Curtiss motors, taken on a mortgage. Will take about one-half value for same. A Besse, Pittsburg, Kan.

PARACHUTE JUMPER WANTED—Apply Lawrence Sperry Aircraft Co., Inc., Farmingdale, L. I.

FOR SALE—10,000 turnbuckles at one-half price. A Besse, Pittsburg, Kan.

WANTED—Several 30 to 60 H. P. motors in good condition. Cheap. H. Lewis, 5119 Indiana Avenue, Chicago, Ill.

WANTED—Rigger and a first class mechanic. A Besse, Pittsburg, Kan.

ACKERMAN LANDING GEAR
Is the latest and highest development in the construction of Landing Gear
Their SIMPLICITY STRENGTH and SERVICE make them the logical equipment for the Modern Airplane.
Weight 96 pounds complete with tires built for craft weighing 2500 pounds
WHEELS and LANDING GEARS built for any size machine
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THE ACKERMAN WHEEL COMPANY
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ANNOUNCING THE

FIRST AIRCRAFT EXHIBITION AMSTERDAM, HOLLAND

The exhibition will be held *during the month of August* under the auspices of the Amsterdam and Rotterdam Chambers of Commerce, and with the official sanction and cooperation of the Netherlands Government.

First opportunity for American manufacturers to exhibit aircraft engines and accessories in Europe.

The American aircraft industry will do well to investigate this exhibition, as it offers genuine business possibilities in Holland and its vast colonial possessions for American air products.

The Exhibition will comprise

1. **Historical group**
2. **Airplanes**
3. **Hydroairplanes**
4. **Motors**
5. **Motorcars and Motorcycles**
6. **Construction details and tools**
7. **Photography, maps and map reading**
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9. **Orientation and lighting**
10. **Instruments**
11. **Meteorology**
12. **Model airplanes**
13. **Medical department**
14. **Dressing, equipment, heating**
15. **Scientific group**

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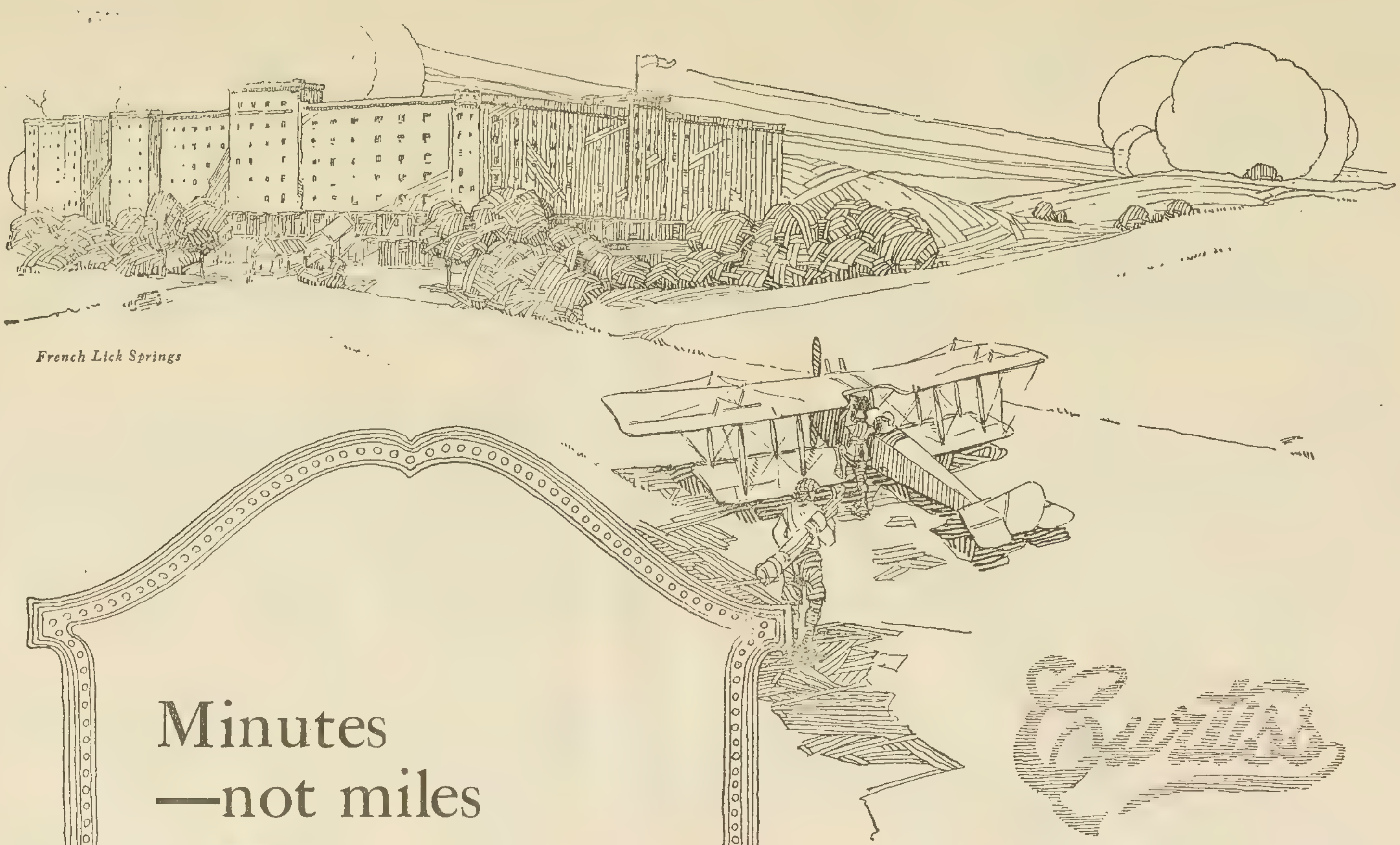

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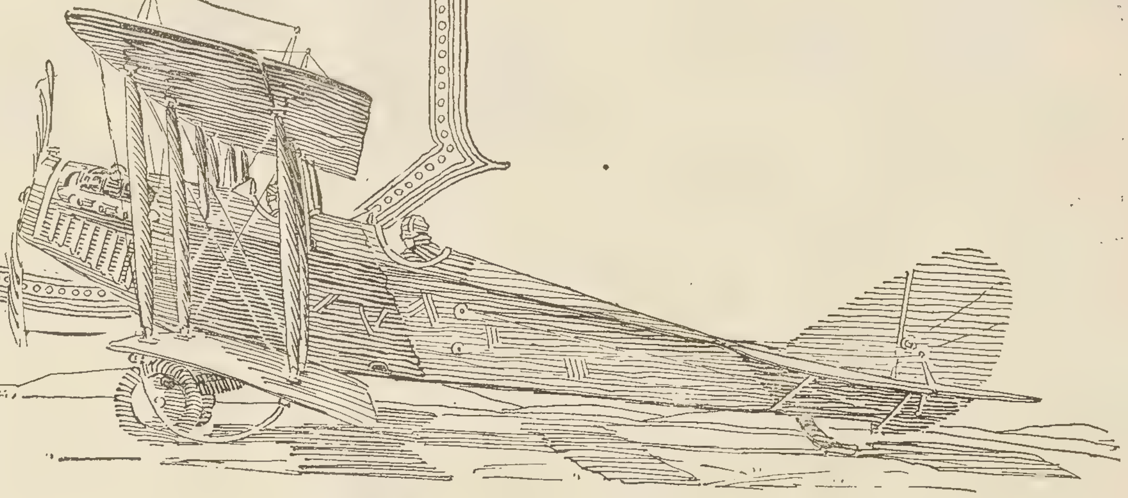

Member Manufacturers' Aircraft Association

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AIRCRAFT JOURNAL

June 28, 1919 *Every Saturday* *Price Ten Cents*

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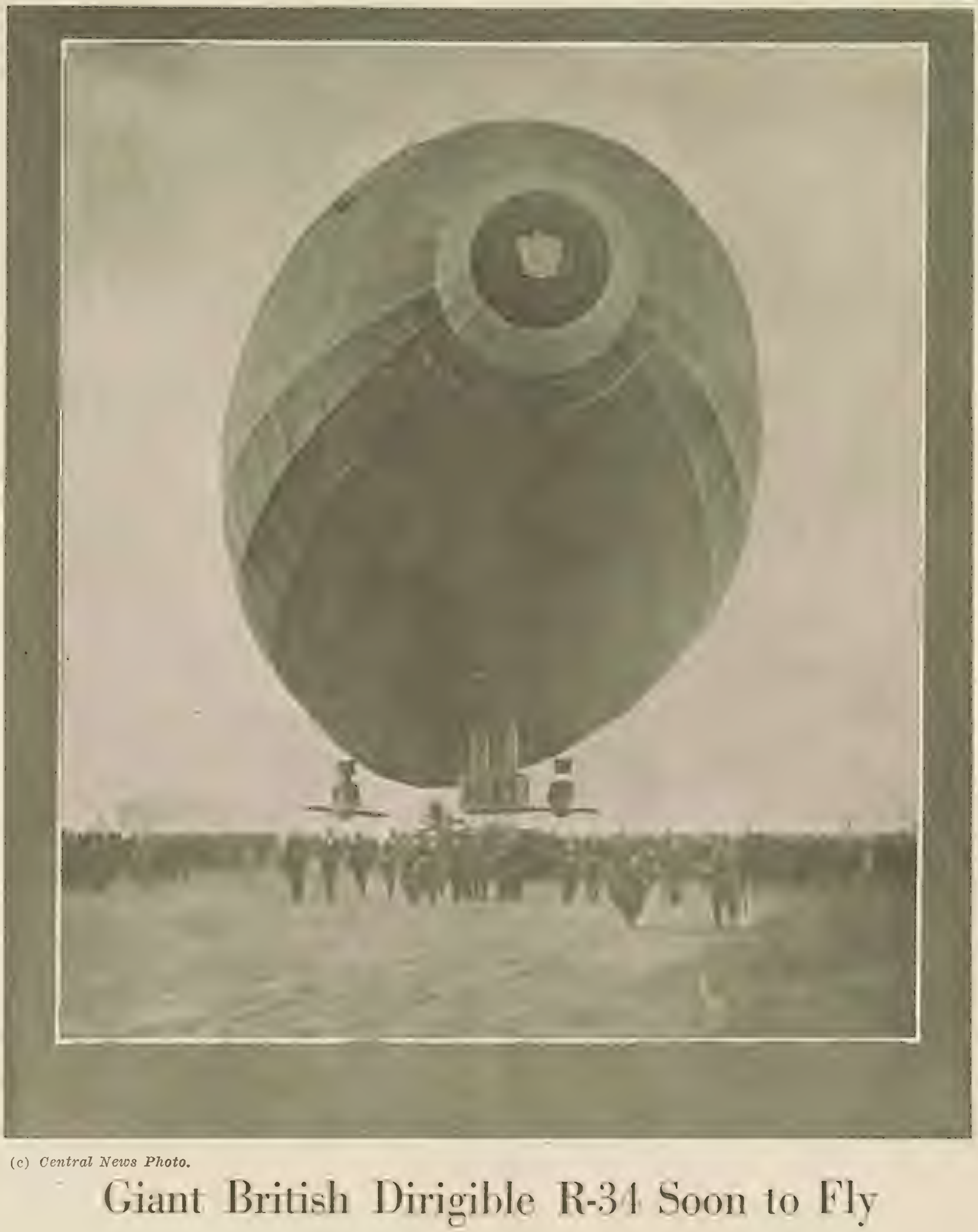
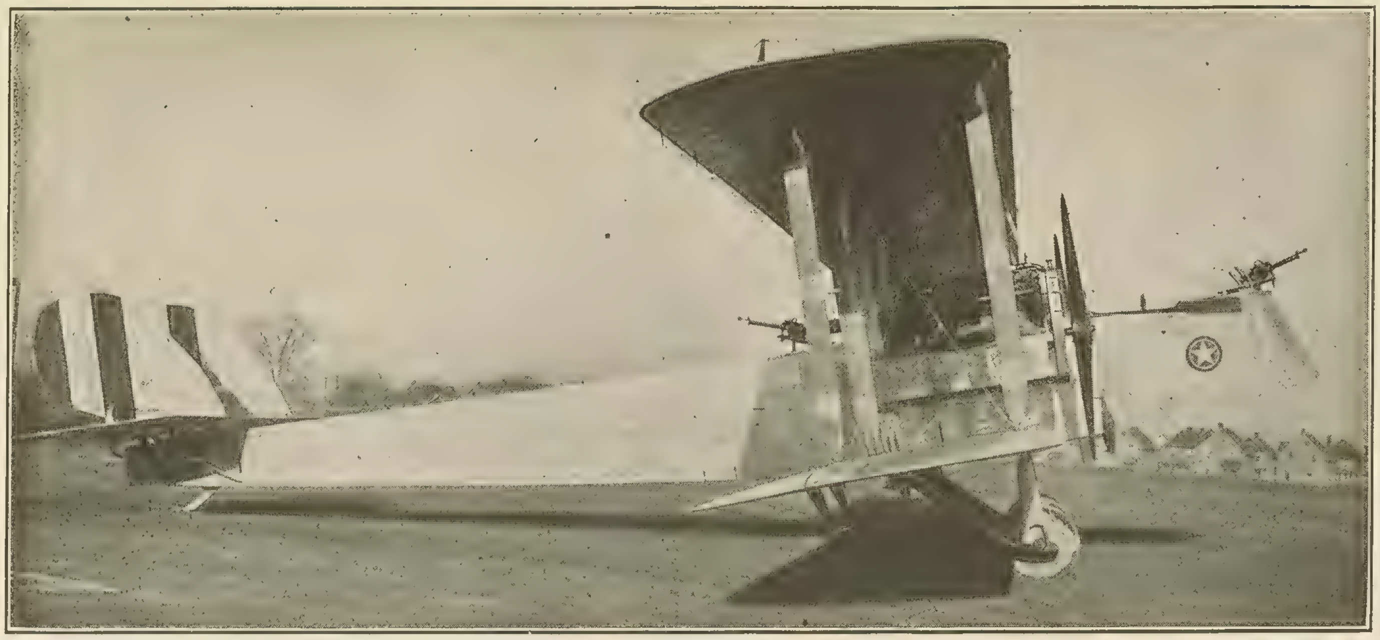


(c) *Central News Photo.*

Giant British Dirigible R-34 Soon to Fly
Across the Atlantic



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Officially, it has surpassed the performance of every competitor.

The forerunner of the wonderful

AERIAL FREIGHTER *and* TWELVE PASSENGER AIRPLANE

The skill and ability of the HOUSE OF MARTIN continue to maintain Supremacy of Performance and Dependability which they have held since 1909.

MARTIN U.S.A.

THE GLENN L. MARTIN COMPANY

CLEVELAND

Contractors to the United States Government

Peril of U. S. Aircraft Parsimony

Secretary of the Navy Daniels Tells Senators the Importance of Adequate Appropriations

The Senate has shown its appreciation of the situation regarding aviation in the Army and Navy by increasing the appropriation from $15,000,000 for the Army Air Service to $55,000,000 and for the Navy Air Service from $15,000,000 to $35,000,000. While $90,000,000 for both services is better than $30,000,000, it is not enough to do more than the experimental engineering and development for the coming year.

The ordering of eighteen planes to the border is significant of what would happen if any trouble arose with any country. We have no pursuit, bombing or satisfactory reconnaissance airplanes. The DH-4 is all that is available and this type would be out of date against a properly equipped enemy. The foreign Spads and other types which are coming over will be poor substitutes for the latest American types.

Constant watchfulness to see that Congress does not overlook the dangerous situation that is possible should be the aim of all who understand what this country not only needs but must have for protection.

Original Estimates

The estimates for Army aeronautics aggregated $83,000,000, which was reduced by the House to an allowance of $15,000,000. The Naval estimates requested $15,000,000 and only $15,000,000 was appropriated.

"It looks as if the House merely filled in the arbitrary figure of $15,000,000 for the estimated $83,000,000 suggested by Secretary Baker," said a prominent member of the Military Affairs Committee, "without reference to the sufficiency of the sum or taking into account what may be accomplished with that amount of money. It is evident the sum is far below the reasonable requirements of the army for the work of experimentation and development of all matters pertaining to air navigation. It is certain the committee will bring the amount allowed up to nearly the estimated $83,000,000 pronounced necessary for the military end of the service."

A similar sentiment prevails in the Naval Affairs Committee. Its members feel there should be no false economy practised in aircraft work and think the Navy officials must be permitted to carry out their plans for improvement in the service. The money needed is regarded as insignificant as compared with the enormous sums wasted in the early periods of the war.

Daniels Asks $36,000,000

Secretary Daniels appeared before the Senate committee and urged an allowance of $45,000,000 for aircraft development, instead of the $15,000,000 appropriated by the House. He impressed upon the committee that the United States will be behind Great Britain, Italy, France and even Germany if the House item is permitted to stand.

"It would be a calamity," he said, "if, after being the first across the Atlantic by air, Congress should now say to us: 'Mark time for a year or so,' while other nations are spending more money than ever on aircraft development."

The Secretary said that if the Senate committee would grant an appropriation of $36,000,000, instead of the $45,000,000 originally asked for, it would enable the department to go forward with development work. He advised that concentration be made on tests rather than on quantity production.

"Would $35,000,000 be sufficient?" Senator Page inquired.

"What is a million dollars among friends?" was the Secretary's reply. "We can conquer the air as we have every other element but we can make no large contribution to the development of aviation in the next twelve months unless we are given an adequate appropriation. Aviation may, in the not distant future, take the place of fast water craft. It will become the eyes of the fleet.

"Aviation is as necessary to the fleet as are destroyers. With proper aviation forces it would be absolutely impossible for any fleet to come anywhere near American shores without our knowing it for a long time in advance."

Captain Craven's Statements

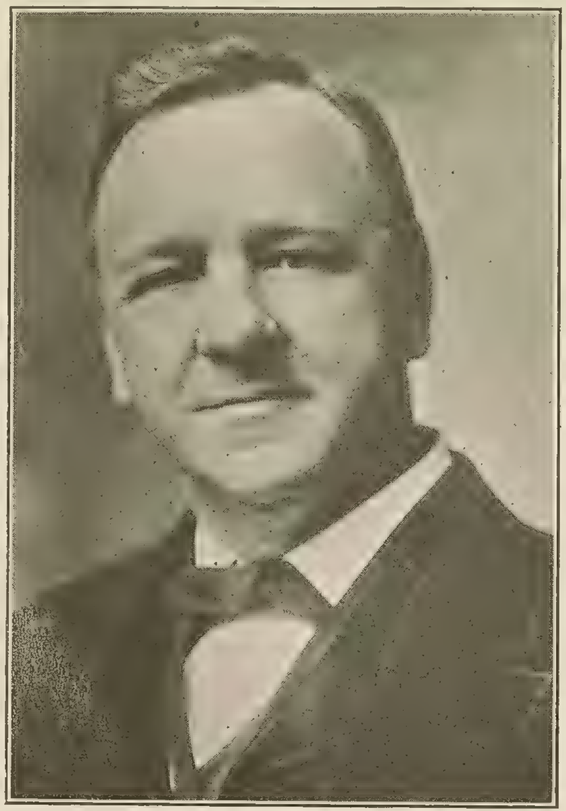

Photo Press Illustrating Service, Inc.
Hon. Josephus Daniels, Secretary of the Navy

Urging an increased appropriation for Naval aviation before the Senate Committee Capt. Craven, Chief of Naval Aviation, declared Great Britain intended to spend $300,000,000 next year for the development of aviation and France $200,000,000.

Plans for the construction of rigid dirigibles would have to be abandoned entirely if the Senate did not increase the appropriation, Capt. Craven said, and experimental work on heavier-than-air craft would have to be greatly curtailed.

Asked by Chairman Page why Great Britain contemplated spending such a large sum, Capt. Craven said it was England's avowed intention "to dominate the air as she has the sea."

Our Place at the Top

Speaking on this subject the New York *Sun* says editorially:

"We can't afford to be at the tail end of aircraft preparedness; we can't afford to be in the middle. The only place for this country, with all its coast lines to be forewarned, with all its sea approaches to be patrolled, with all its riches to be safeguarded, is at the top of the list.

"Nobody is more earnest for national economy than we are. Nobody has urged more strongly the cutting of all needless expenditures to the bone. Nobody hates any waste of the taxpayers' money more than we do; we hate it like poison. But aviation has become the very first weapon of offence and defence by land and by sea. Without air mastery—and for us this means air mastery at home over tens of thousands of miles—fleets and armies count for mighty little.

"France is going to spend two hundred millions of dollars on her air service. Great Britain is going to spend three hundred millions of dollars on hers. We don't know how much we need to spend on our own national insurance. That is the business of the experts. But if we need to spend half a billion of dollars to keep not up with but ahead of the procession we must spend every copper penny of it."

Proud of Our Naval Fliers

The following letter explains itself:

NAVY DEPARTMENT
Washington, June 14, 1919.

Editor, Aircraft Journal:

The Navy Department and the entire country take deep pride in the remarkable achievement of the American Naval Aviators taking part in the trans-Atlantic flight. Too much praise cannot be given those men who so courageously set forth to blaze the way through the air to foreign shores and demonstrate the possibilities of trans-oceanic travel by air.

The efficiency shown by the crews of the NC-1 and the NC-3 in their trying experiences is no less than that shown by Commander Read and the crew of the NC-4 in successfully completing the longest overseas flight on record. Their performance marks the beginning of a new chapter in man's conquest over nature, and demonstrates the possibility of using aircraft as a means of transportation. Annihilating both time and distance, they have brought into closer relationship the peoples of two continents.

The planes used by the Navy were not designed and built with the single idea of establishing a new record, but were intended for war purposes. They were to be flown across the Atlantic to take an active part in the operations abroad. After the Armistice was signed, it was decided to continue plans for a trans-Atlantic flight in order to test our design and equipment, and, with this in view, preparations were made. The success of the enterprise is now apparent and in the accomplishment the best traditions of the Service have once more been upheld.

In the minds of many, the present flight, although being successful, shows that larger airships must be developed in the future in order to permit regular trips. Whether heavier-than-air craft or lighter-than-air craft will be the more successful is still problematical, but, at the present time, opinion is strongly in favor of the lighter-than-air craft, as it is thought that large dirigibles can more easily carry out such flights and can better be adapted to commercial usage.

Very truly yours,
Josephus Daniels.

Origin of "Blimp"

The term "blimp" is a slang expression borrowed from the English, and in a Dictionary of Military Forms, by Farrow, is described as "a slang name given to a small dirigible designed to locate and observe submarines." In a pamphlet of Aeronautical Terms published by the War Department, it is defined as "a small non-rigid dirigible used chiefly for marine reconnaissance." It is not a term covering all government dirigibles, but only those of small non-rigid types, and our "blimps" were copied after those of the British Naval Air Service and are designed especially for coast patrol and are controlled by the Navy Department.

Airplane Influence on Internationalization

Cooperation, and Rules for Its Control Are Necessary for the Full Development of Aviation

The British air staff has for some time been mapping out the stages of aerial routes to Australia from Cairo via Damascus, Karachi, Delphi, Calcutta, Singapore, Sumatra and Australia. Pioneer flights have been made along this route as far as Karachi, Delphi and Calcutta, and a good deal of valuable information obtained. In Australia the first aerodrome base will probably be Normanton, on the Gulf of Carpentaria, the route leading thence to Sydney, Wyndham and Melbourne, and at Melbourne branching into two routes, one west to Perth and the other south to Tasmania and east to New Zealand. The significant fact is that for practically the whole proposed overland route from Cairo to New Zealand the air bases will be on British territory and the air routes over British territory or the sea.

Photo by Paul Thompson.

FOLKESTONE-COLOGNE AIR MAIL

The daily aerial service between Folkestone and Cologne is proving very successful. When the service was instituted on March 1, four airplanes carried between them twenty-five bags of mail, but the mail has so greatly increased since then that it has reached a grand total of 2276 outward and 386 inward bags. For three months correspondence leaving Cologne one morning has been delivered in all parts of England and Wales from Folkestone by the first delivery the following morning

The same will be true of the proposed overland route from Cairo to Cape Town. The absorption of German East Africa by the union of South Africa will make an all-British corridor for an aeroplane the length of Africa by way of Egypt, the Sudan, British East Africa, British Central Africa, German East Africa, Rhodesia, the Transvaal and Cape Colony. There is also an alternative water route being plotted which will follow the Nile, the Great Lakes, the Zambesi River (by special arrangement with the Portuguese) and along the coast to Cape Town.

Egypt the Nerve Centre

The Suez Canal has been the jugular vein of the British Empire. Egypt will be the nerve centre of its aerial organism. For Egypt is destined to be the great mobilization point of Britain's air forces and the base to which air squadrons can be drawn from either side of the great semi-circle and concentrated for service wherever the need arises.

But the laying out of the great aerial horseshoe does not complete Britain's plans. She must connect it up with London—a task which is much more complicated from the standpoint of high politics because it involves routes over the territory of other nations of Europe. An aeroplane can fly from London to Cairo via Gibraltar without passing over foreign territory or foreign territorial waters. But the air route would be long and airdrome bases at great distances apart in comparison with the proposed land route of 2,000 miles across France, down the length of Italy and Greece and across the Mediterranean to Cairo. Such a route necessitates an entente cordiale with the nations of Western Europe, and is one of the reasons why Great Britain can never contemplate with complaisance a loosening of the bonds which now hold the Allies of Western Europe together.

French a Year Behind

It is estimated by the French themselves that they are at least a year behind the British in the air. Only the general outlines of their programme have been thought out. Mixed squadrons of sea and air 'planes are to be sent to Madagascar, Indo-China, West and Equatorial Africa and to the Antilles. At present three bodies are working with a special commission of the French War Ministry for the development of civil aeronautics. They are (1) an inter-ministerial commission in which the departments of Posts, Telegraph, Commerce and the Colonies are represented; (2) a *Comite d'Action*, composed of members of the Aero Club of France, which will keep the French government informed of the wishes of French manufacturers, and (3) a special committee of the French Chamber of Commerce.

The French are doing a great deal of experimenting with mail and passenger services between Paris and Brussels, Paris and Bordeaux and other cities in France. They are also thinking of their great colonial empire in Africa, and the air routes which will connect it more closely with France. And here the international situation is somewhat the same as with air routes between London and Cairo. French pilots need not fly over foreign territory to Algiers or Morocco. A long flight across the Mediterranean or skirting the west coast of Spain is a possibility. But a glance at the map is sufficient to show that Spanish territory is the logical corridor from France to Africa. It was over Spain that a trip was recently made from Toulouse to Casablanca by Lieutenant Lemaitre and M. Letercoere, who covered the 1,800 miles in eleven hours of actual flying. The ordinary postal service takes six days.

The aeroplane will not only connect up France and Africa much more closely. It will also bind together the different sections of France's colonial territory in Africa. The Sahara will become a less formidable obstacle to intercommunication. French pilots have been recently engaged in experimental flights over parts of the Sahara in the search for the best routes and landing places which will be the links in communication between Morocco and the Ivory Coast, and which will make less difficult the supervision of a territory that is as big as all Europe outside of Russia.

But French plans go further than Africa. One argument that is put forward for a Franco-British syndicate and an aerial entente is that the way from London to South America leads across France in Europe and France in Africa and thence from Rabat to Pernambuco.

Air Roads to Rome

To the Italian all roads lead to Rome, whether on land and sea or in the air. And Italy is close on the heels of Great Britain and France in her flying development. Prizes have decently been offered for non-stop long distance flights from Rome to Paris, Rome to London and Rome to Constantinople. The first regular Italian air service probably will be one connecting Rome with Sardinia, the next a line from Rome to Naples, to be projected later to Palermo, Tunis and Tripoli. Another Italian route that has at least been marked

(*Continued on page* 14)

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Westward the Air Mail Takes Its Course

Extension of the Service from St. Louis to Omaha, Shortening the Transcontinental Delivery

The aerial mail is going West, says an announcement from Assistant Postmaster-General Otto Praeger. Fifty-eight consecutive trips of mail airplanes between Cleveland and Chicago have led the department to extend the service from St. Louis to Omaha, thus shortening the transcontinental mail delivery between the Atlantic and Pacific coasts from twelve to twenty-four hours.

"The department," said Mr. Praeger, "is able to state that experiments are now being carried on looking toward the delivery and taking aboard of mail bags while the airplane is in flight. It was not so many years ago when it was thought remarkable for a fast steam train to accomplish this feat.

To Snatch Mail in Flight

"It is now regarded as possible for the lightly loaded 'ships,' those carrying 1,000 pounds of mail or less, to come close to earth and snatch bags from especially prepared apparatus.

"In the case of the large multi-motored ships for which the department will shortly let bids no attempt will be made to come near the ground, but a scheme is proposed for dropping mail and possibly taking on mail from the roofs of buildings. If this proves practicable it will be possible on the New York-Washington route to make non-stop runs, serving both Philadelphia and Baltimore and eliminating fifteen minutes at each place.

"Fireproof compartments for mail on airplanes have also been developed successfully."

To Cover Country

Postal officials say the service eventually will include the entire country.

"Reports show," said Mr. Praeger, in an analysis of results achieved on the Cleveland-Chicago route, "that fifty-eight consecutive trips of 325 miles each have been made between Chicago and Cleveland without delays, without forced landings, and without engine trouble. These flights have been made in weather which, a short time ago, would have been regarded as prohibitive. Each day, each way, the 'ships' carried 400 pounds of letter mail. As letters range from forty to forty-five to the pound, this means that 16,000 were transported on each trip.

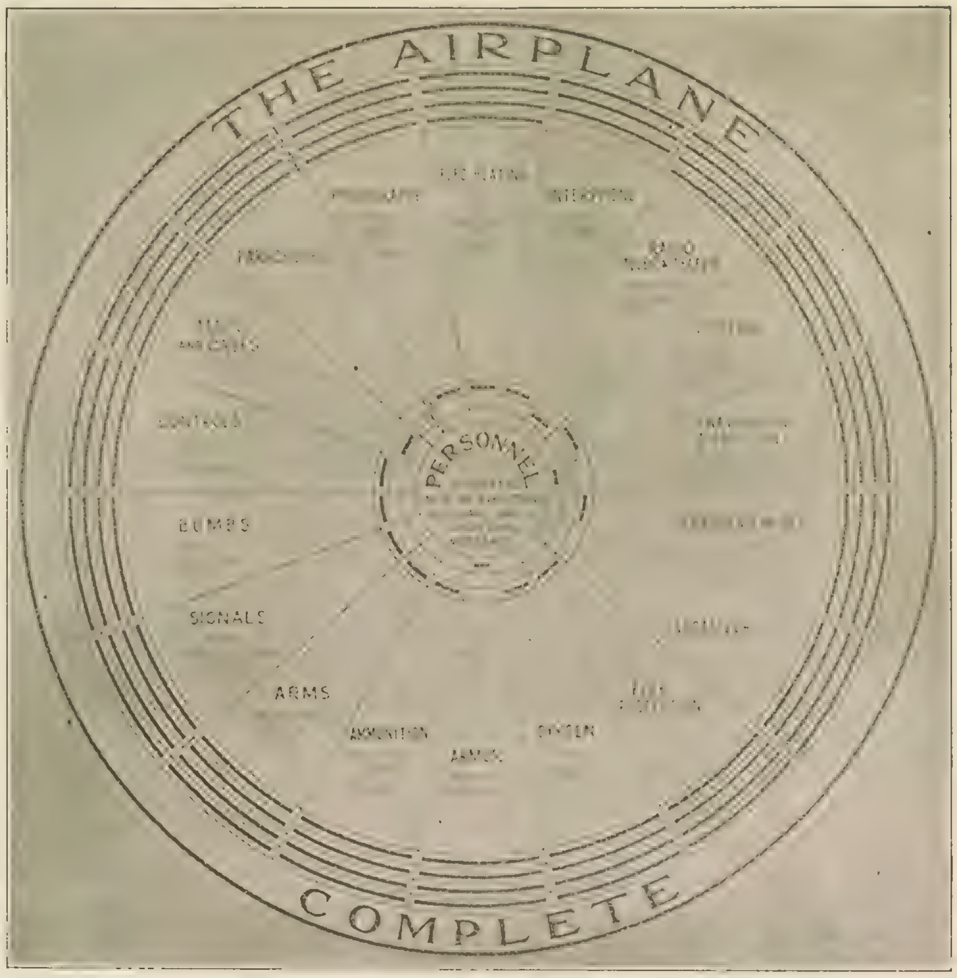
"Twelve of the L. W. F.-de Havilands are in the Cleveland service, four being stationed at each terminal and four at Bryan. The service shows some interesting time results. Short as this link is, in comparison with a transcontinental line, Pacific coast mail is even now advanced sixteen hours to Boston and New England points. The reason is that, by speeding up a few hours at a vital point, the mail reaches its destination in time for afternoon delivery instead of the following morning. Pacific coast mail routed via the airplane link is delivered in New York in the morning instead of in the afternoon.

Save Time Westbound

"Westbound a similar saving is achieved by taking the mail from the 7 o'clock A. M. express train in Cleveland, transferring to the postal plane, and carrying it on to Chicago at almost double the speed of steam transportation.

"From now on the mail planes will leave Chicago for the East at 2:30 o'clock P. M. It was found that 151 great business concerns sent special messenger mail each noon in an effort to catch the two fast mail trains to the Atlantic seaboard. This meant that much of the correspondence had to be completed the night previous. The 2:30 o'clock airplane service means that often eight hours to an entire day is saved, and even in the case of the special messenger delivery to the train from two and a half to three hours are saved. Incidentally the ability of the aerial mail to land and take off from Grant Park, which is in the very heart of Chicago, is further evidence of the need for landing fields within the cities. Then complete advantage is taken of quick transportation offered by the airplane.

"The mails are constantly growing heavier, and it is a problem to find sufficient rail equipment. Satisfactory operation of the air mail between Cleveland and Chicago has thus been the means of relieving rail congestion, and one distributing car each way, each day, has been cut from that division. Distribution of airplane mail is done in the Post office. This means that $52,000 yearly is saved, while at the same time rail equipment is released for service elsewhere and mail expedited."



This diagram, prepared by Col. Clarence C. Culver, A. S., shows visually the importance of co-ordination in the design of airplane equipment in all its details, and in the design of the airplane itself as a means of carrying this equipment.

One airplane will function far better when it and the equipment it is to carry are all properly co-ordinated in design, each with the other, than another airplane carrying the same equipment but lacking the co-ordination.

In outer circles heavy line indicates type of airplane on which the equipment is desired.

1. *Observation and reconnaissance.*
2. *Bombing.*
3. *Large pursuit.*
4. *Single-seater pursuit.*

In inner circles heavy line indicates state of development of apparatus.

5. *Apparatus workable but not co-ordinated.*
6. *Apparatus workable for some types of planes.*
7. *Apparatus in experimental stage.*

R-34 May Start July 4

Information has been received at the Navy Department that the British dirigible R-34 probably will not leave Great Britain on the round trip across the Atlantic before July 4. It is understood the start next month is dependent upon the signing by the Germans.

An Edinburgh correspondent telegraphed June 21 that the R-34, which returned to her moorings early that morning, carried out a round trip from East Fortune to the Baltic and back, a distance of 2000 miles.

Arrangements for the formal reception of the British fliers are in the hands of the Navy which will be represented on a joint Army and Navy reception committee by Vice Admiral Albert Gleaves, Rear Admiral James Henry Glennon and Capt. T. T. Craven. The representatives of the Army will be Major Gen. Chas. T. Menoher, Brig. Gen. William Mitchell and Col. Chas. DeF. Chandler.

The landing will be made at Roosevelt Field, an Army flying field on Long Island, where Army Air Service officials will have charge of the field, the policing and the general guarding of the airship.

The Navy will supply the British Flying Officers detailed here to receive the Airship with an experienced handling crew of dirigible men, as well as mechanics and technical experts under the direction of Lieut. H. W. Hoyt. An additional number of men will be furnished by the Army for assisting in handling the dirigible when she lands and takes off.

Brig. Gen. William Mitchell, Army Air Service, will have charge of the field, assisted by Col. Archie Miller.

After a Record

With favorable weather conditions Roland Rohlfs, an American pilot flying in an American airplane with an American engine, will soon try to set a new world's record for altitude. The present record is 33,136 feet, made recently by Adjutant Casale, a French aviator.

The attempt will be made in a Wasp, a new Curtiss triplane, designed for the army as a fighter but not completed until after the armistice was signed. In official government tests, with a full military load of pilot and gunner, four machine guns and ammunition, the machine flew 163 m.p.h. and climbed 16,000 feet in ten minutes.

Shall Army and Navy Airships Be Similar?

Effect of the Sea Air and Water on Aircraft Material and Other Questions

During the development of the Coast Artillery equipment, the fact was impressed on the Army authorities that sea air and sea water were very corrosive agents. For instance, gun carriages having parts made of thin sheets of steel or delicate rods would soon be pitted, and the thin or delicate steel mechanism would be full of holes, or would even lose complete sections. Rust warts would form between moving surfaces, thus jamming the operation. Aluminum scales and instruments would turn into the consistency of paper and break up on rough handling. Then there came an era of ponderous bronze castings, costly but durable. Then heavier steel, etc., until the coast equipment was no longer mobile. Artillery Officers thought of the sea, dreaded its ceaseless corrosion and the daily drudgery of keeping the equipment in condition for use. Persons employed on or near the sea will soon allow for this sea effect on material and will not hesitate to put on weight to guarantee durability.

U. S. Naval Officers Planning the Trans-Atlantic Flight

In aeronautical construction, this same trend of design is already noted. It will always be possible to use cheaper and lighter material in the dry regions of the interior than along the coast. It will also be possible to get longer service out of them. Compare war relics exposed to the elements at inland places to those exposed near salt air, and the point is apparent. There will be great differences of opinion on matters of weight and cost. It therefore would appear that equipment built for use near the ocean should follow naval precepts, and that equipment for use inland or near fresh water should follow Army precepts.

War Revived the Airship

The first airship built for the Government was tried out at Fort Meyer. Also the first airplane. The airship as an army institution soon fell into disuse. The threat of war revived the subject in 1916-1917. The army was loaded down with the burden of mobilizing a great new army. The captive balloons seemed to be the only thing to put on the battle line in a hurry. The Zeppelin rigid dirigible for a short time in 1914-5 was the terror of the air. It bombed Belgian troops and cities with impunity. Then came aerial gunnery, and the flaming bullet. Then the Zeppelin had to keep away from the line of battle and low altitudes over hostile territory. The French did not try to use dirigibles as fighting weapons. The airship seemed discredited. It dawned on the British Admiralty that the Zeppelin, withdrawn from conspicuous land warfare, became the soul of the German Navy. English submarines near Germany and Holland in the North Sea and the Baltic became aware of some constant and efficient surveillance. We ceased to hear of them then. Why? Simply this, the Zeppelins and other aircraft could watch them effectively.

Advent of the Blimp

Then the British non-rigid puller airship or Blimp came into the game. It was made by hanging an airplane fuselage under a little Streamlined gasbag, with the rudders, etc., on the bag. Then the one-engined pusher, so that the pilot wouldn't have oil and wind in his face all the time. Then a little more size and two engines, etc., until the seagoing non-rigid became a real large ship with sleeping quarters, etc., that could escort convoys hundreds of miles out to sea.

The Navy people brought the airship back into its own. It was a little branch comparatively speaking, that acted secretly and efficiently. The world hardly appreciates yet what the airship did to eliminate the submarine menace. Consult the log books of the surrendered submarines, and in them you will see constant references to whole days submerged because of dirigibles in sight. Seventy dirigibles of the British Navy have almost as many submarine attacks to their credit as the whole navy and seaplane services together. Add to this their moral effect on submarines, and the reason for the rapid development of seagoing dirigibles will be apparent.

Italian Development

As for Army airship development it seemed to stop. In Italy alone this was not so. The Italians developed the semi-rigid type capable of fair speed and endurance even at enormous altitudes. These airships could proceed over the Adriatic Sea, or even over the Alps Mountains by routes where airplanes and anti-aircraft guns were scarce, and bomb Trieste or other centers with impunity. Of course, they were obliged to beat a hasty retreat each time, and were even put into leaky condition on occasions, but the fact remains that they saved many ships. These ships were operated by both Army and Navy Officers. From this it might be inferred that a common type of ship will do.

But is this the case in America We have a vast area of high mountainous territory where the climate is hot and dry. Ships must start from high altitudes and return to high altitude stations. Some of these ships can sail over deserts, immune from artillery and airplane attacks. These ships certainly must have fabric, metal, and wood parts for such climatic conditions. Would an airship built for use at sea level stations and humid salt air stand the heat and dryness? Vice versa, would a light weight interior machine stand the moisture if brought down to the sea?

Coast Defense Problem

The Army has on its hand the problem of coast defense. This means small fire control dirigibles and small local patrol craft. These must stay constantly near the ocean. They will need a few special fire control instruments, but they should be similar to navy types. The nearer the better. Being so, the Army airships can be a reserve for the Navy, in case Navy activity is greater or vice versa. There might be a single set of drawings and specifications for most parts and a standard price.

On the other hand, the Navy and Marine Corps might want to conduct small expeditions to some distant places like the Coast of South America or Africa where it is dry and hot. If the forces had to stay there quite a while with an inland mountain base, would it not be advisable to have a gasbag and nacelle suited to such conditions. Here a special army inland development would be in order.

Navigation overland is somewhat different from navigation over the seas. The overland navigator can get better weather data and can find by direct observation of the landscape, what his rate of progress is and his whereabouts. In case of trouble he knows that he can get down on land and even save his ship. The navigating instruments do not need to be as excellent as they are over the sea. The ship does not need to be designed for such long trips. The nacelle can be lightened and life-saving gear can be eliminated. The chances are that a cheap commercial type will be evolved that is suitable for army use for local purposes. The army is justified in maintaining a modest engineering staff, but it should cooperate very closely with the Navy in non-rigid construction.

Types

The semi-rigid seems to be the best bet for a medium-sized ship for army use on account of its high altitude capabilities. If the airship is ever to be used as a bomber, it must work at night and at great heights. The Army should be able to subject an enemy to the commercial and military burden of anti-aircraft defense for every city or important military asset. The Navy should specialize on attacking seaports, docks, locks, etc. But if the reports on the late war are an indication, the Navy should not stop at the non-rigid airship, but should proceed at a single step to the rigid type.

The Army may have use for a few rigid ships, but it will have a great deal more use for the semi-rigid types. Joint Army and development would be proper in the case of both, the Navy leading in large rigids, the Army leading in small rigids and semi-rigids. A foot free Navy and an efficient coast defense heretofore have been American ideals. What is an efficient serial defense? Where will it act? What will it cost? Is it a Navy affair or an Army affair?

Analyze the problem as you will, you will finally come back to the old knowledge that forces acting

(*Continued on page* 10)

News of the Army and Navy Air Services

Organization Recruiting

This letter explains itself:

WAR DEPARTMENT—ADJUTANT GENERAL'S OFFICE,
WASHINGTON, D. C.

Organization Recruiting—Air Service.
Expedition from New York to Seattle.

From: The Director of Air Service, June 3, 1919.
To: The Secretary of War, Washington, D. C.
Subject: Organization of Special Air Service Detachment (Recruiting).

1. Plans have been made in the Air Service to organize, equip and maintain a special Air Service detachment to be used for recruiting purposes. It is contemplated sending this detachment overland via airplanes and truck from New York to Seattle.

(a) For the purpose of stimulating recruiting and obtaining recruits for the Air Service and for the Army at large;

(b) For the purpose of mapping serial routes for the Air Service and for the aerial mail (this is at the special request of the aerial mail authorities);

(c) For the purpose of examining and making recommendation for the establishment of municipal landing fields;

(d) And for the purpose of making maps and taking pictures of fields so that the Air Service records on municipal landing fields and air routes will be complete.

2. The proposed itinerary of this unit has been worked out by the Air Service after consultation with the aerial mail authorities and the interests of both can be best served by having the detachment move from New York City, via Uniontown and Pittsburgh to Indianapolis and St. Louis, and thence to Chicago, Milwaukee and St. Paul, covering intermediate towns. From St. Paul it is contemplated pursuing a course through the Dakotas, Montana, Idaho, Washington and Oregon to Seattle. The territory through which it is desired to travel is virgin field for waging a vigorous campaign for Air Service recruits. It is also territory for which aerial maps must be obtained for the establishment of aerial mail routes and cross country lines of travel for the Air Service. The territory from St. Paul to Seattle has never been traversed by airplane and it is desired to open up an aerial route along this northern field.

3. The personnel and equipment required for this detachment are available.

4. The maintenance of such a detachment on a tour as contemplated will require only a nominal additional outlay over the expenses required of the Government for troops on duty at an established field or post.

5. The proposed commissioned and enlisted personnel has been selected to the end that the maximum efficiency and results may accrue with respect to the plotting and the necessary landing fields. The proper trade-testing, examining and classification of recruits obtained by enlisting men in the Air Service and in the Army at large has also been provided for.

6. It is contemplated to have the detachment consist of ten officers and thirty-six enlisted men. The equipment will consist of:

(a) Four airplanes to be flown from place to place.

(b) Photographic lorry and trailer complete. This photographic outfit would be so equipped as to be able to take and develop photographs throughout the trip.

(c) One machine shop truck and trailer with the necessary machinery to keep the airplanes in repair.

(d) Necessary spare parts so as to keep the airplanes constantly in commission.

(e) A certain number of propaganda balloons with the proper personnel to stimulate interest in the lighter-than-air branch of the Air Service.

The mechanical personnel would be selected, competent to effect the efficient trade-testing of recruits received for the Air Service.

7. It is desired to apportion the duties of the commissioned and enlisted personnel as follows:

Commissioned.

1	Commanding Officer for the Unit.
1	Aerial Navigator for traversing and mapping.
2	R. M. A. pathfinders, pilots.
1	Chief Photographic Officer.
1	Assistant Photographic Officer.
1	Officer in charge of balloon and airships material.
1	Unit Supply Officer.
1	Mechanical Training and Recruiting Officer and Engineer Officer.
1	Chief Serial Routing and Mapping Officer.
2	R. M. A. pilots.
1	Flight surgeon and recruiting examiner.
13	total officers.

Enlisted.

8	Photographic artisans.
10	Airplane mechanicians.
2	Balloon mechanics.
2	Administrative.
2	Recruiting sergeants.
7	Chauffeurs.
2	Cooks.
1	Stenographer.
1	Mess sergeant.
1	Radio and searchlight man.
36	total enlisted men.

8. The following is the equipment necessary for this trip, all of which has been found available.

4	JN-4 Curtiss planes.
15	Per cent spares for repair.
2	Undercarriages.
4	Propellers.
2	Touring cars.
1	Motorcycle, with side-car.
1	Photographic field lorry, with trailer.
6	Pyramidal tents, with poles, pins, etc.
1	Small wall tent, with poles, pins, etc.
1	3-ton portable machine lorry complete, with kits.
2	One-half ton trucks, with trailers.
32	G. M. cots.
100	Blankets, O. D.
1	Underwood No. 5 typewriter.
2	Field desks.
1	Storm flag.
1	Flag, recruiting.
2	Cans, water, G. I., with cover.
6	G. I. buckets, 12-qt.
1	Field range No. 1, with Alamo attachment, complete with cooking utensils.
30	Mess kits, complete.
6.	Lanterns, wicker oil.
6	Flashlights, electric, with batteries.
6	Covers, canvas, airplane wing.
4	Covers, canvas, for propellers.
4	Cans, oil, 5-gallon.
1	First-aid kit, field, complete.

9. It is contemplated flying the planes from place to place. The balance of the personnel and equipment, not in the planes, will go overland from town to town, establishing its own camp, maintaining its own headquarters and operating as a small flying field. The detachment will be able to lie in camp, maintaining messes for the officers and enlisted men.

10. It will be possible to give the interested candidate for enlistment an opportunity to see an Air Service unit under actual living conditions.

11. The plan has been submitted to Colonel Totten of the Adjutant General's office, and he has voiced his approval verbally of the same.

12. It is requested that:

First: That authority be given by the Secretary of War to organize and send out this expedition.

Second: That the enlisted personnel be allowed expenses, not to exceed $1.60 per day.

Third: That commissioned personnel be allowed expenses, not to exceed $4.00 per day.

13. Enclosed herewith you will find copy of letter from the Assistant Postmaster General, asking for co-operation in the very work that this expedition has been organized to accomplish.

By authority of the Director of Air Service,
CHARLES T. MENOHER,
Major General, U. S. A.,
Director of Air Service.

Ensign E. H. Mulliken, U. S. N. R. F.

Ensign E. H. Mulliken, U. S. N. R. F., recently carried out a brilliant exploit in a Navy E-1 Dirigible. While cruising in the Gulf of Mexico, the rudder broke. Ensign Mulliken took the dirigible up to a height where the air currents were favorable for a return, and piloting the dirigible as a free balloon, returned to Pensacola without a mishap. The exploit received much commendation from his chiefs.

Comparative Casualties

Of the air service casualties of the American Army in France, 50 per cent of the total was in men killed, according to figures revealed by the War Department. This was a considerably higher percentage of killed as compared with lesser casualties than is disclosed by the corresponding records of the British and French aviation services.

Taking the total of killed, wounded, and missing for each nation as 100 per cent, the proportion of Americans, British, and French air service casualties in these three classes is disclosed as follows:

American casualties: Killed, 509, or 50 per cent of total; wounded, 241, or 23 per cent; missing, 277, or 27 per cent of actual casualties of American airmen.

British casualties: Killed, 2680, or 36 per cent; wounded, 2988, or 40 per cent; missing, 1837, or 24 per cent of British total.

French casualties: Killed, 1945, or 31 per cent; wounded, 2922, or 46 per cent; missing, 1461, or 23 per cent of French total.

Total for the three services: Killed, 5134, or 35 per cent; wounded, 6151, or 41 per cent; missing, 3575, or 24 per cent.

The killed included training casualties and deaths from accidents; the missing included also prisoners.

Sixty-four per cent. of the present Army Air Service personnel is still overseas. The strength of the air service of the army now overseas is 27,084, as compared with 15,580 in this country.

Mather Field Forest Patrol

The Mather Field forest fire patrol continues daily and covers valuable timber land. The schedule was inaugurated on June first. Two patrols leave field daily. One covering points from Mather Field to Tahoe National Forest and return, distance approximately one hundred eighty miles. Other patrol covers points from Mather Field to Eldorado National Forest, and return, covering distance approximately one hundred eighty miles. Time necessary for each trip, three and one half hours. Altitude from seven to eleven thousand feet. Atmospheric conditions, normal. Lieutenant Tobin S. Curtis and Sergeant First Class Cecil W. Buckley made first trips in Curtiss JN-4D planes with O X five motors equipped with extra gas tanks for four hours capacity. Landing on North trip was made at Oroville and on southern trip at Chinese Station. Three fires were spotted by northern patrol and reported to Forestry Service first day.

Beat the Germans Two to One

Complete records of enemy airplanes and balloons actually destroyed and certified to show that we brought down two enemy aircraft for each one we lost, or slightly more. The completed figures seem to indicate 755 enemy airplanes and 71 balloons brought down, and we lost 357 airplanes and 43 balloons. There are a large number of extra aircraft claimed by men who saw after combat with a German airplane the plane fall, but it fell back of the enemy lines and these were not counted. The figures given include actually certified losses of German aircraft.

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Formerly Air Service Journal

Air Service Appropriations

SECRETARY DANIELS and Captain Craven of the Navy and Generals Menoher and Mitchell of the Army Air Service deserve great praise for the manner in which they have presented to Congress the imperative needs of the Air Services. Before the Senate Naval Affairs Committee, the Secretary of the Navy singled out aviation as the most pressing need of the Navy. He emphasized the fact that the Navy is practically without eyes at the present time, having no turret planes nor mother ships of aircraft. Particularly significant of the present situation was his remark that $36,000,000 would satisfy present needs, but by December, he would probably have to return to ask for an increase. Captain Craven's statements to the committee explaining the various items have shown his broad conception of the requirements of the service of which he is the head.

The Army Air Service has had to fight its own way without as outspoken help of the Secretary of War. While the projects have had the approval of the War Department, the burden of proof has rested on General Menoher's shoulders. He has explained and expounded on subjects that he has only recently been concerned with, clearly and convincingly. His personality has been a great factor in gaining the confidence of congressmen for the projects desired for the Air Service. His staff has fought with him and to them will go a large share of the credit for convincing doubting hearers of the immediate requirements in aircraft equipment of this country.

While the appropriations will not compare with those of Great Britain or France, they will keep the services going for a few months and enable orders to be placed which will keep the aircraft industry going until a real Air Service program is determined on.

Shall We Be Last?

PERHAPS the world's aircraft situation, so far as the future is concerned, has not been presented more clearly than it was in the following editorial printed by the New York *Tribune*, June 23:

> In 1914 Germany was first, France was second, Great Britain was third, Italy was fourth and the United States was last in the appreciation of aircraft, measured by the amount of money each one was willing to spend on that arm of preparedness. Their appropriations for the military air service in that year were as follows:

Germany	$45,000,000
France	12,800,000
Great Britain	1,800,000
Italy	300,000
United States	300,000

> When the armistice was signed, on November 11, 1918, the personnel of the military air service in each of these countries was as follows:

	Officers and men.
Great Britain	295,000
United States	184,852
Italy	100,337
France	80,000
Germany	Unknown

> Before the war was over both Great Britain and France began to plan for civil aviation. French contracts with airplane manufacturers obligated the government to maintain production at war-time rate clear up to March 1, 1919. Thus, French factories were enabled to get literally a flying start. On May 22, 1917—during the darkest days of the war in so far as England was concerned—an Imperial British Committee on Civil Aerial Transport After the War was appointed. This committee came to three major conclusions: (a) That Great Britain's cherished insularity was a thing of the past; (b) that an adequate air service was necessary to national defence; (c) that a correspondingly adequate system of civil aviation and private aircraft industry underlay national defence in the air. Therefore, the committee came to this final decision: "Cost what it may, this country (Great Britain) must lead the world in civil aerial transport." These findings impelled the British Parliament to make appropriations for the year 1919-20 as follows:

Experiments and research in civil aviation	$15,000,000
Military and naval (joint service)	315,000,000
Total appropriated for the air	$330,000,000

> Following a similar line of reasoning the French government is considering an Air Ministry, and in the mean time has made appropriations of $220,000,000 for aviation in 1919-20.
>
> The French are led by even stronger reasons than those which persuaded the English. Realizing that civil aviation must ever be closely allied with military, they point out that Germany is free to develop civil aeronautics, the only limitation, under the terms of the treaty of peace, being that construction shall not begin until six months after the pact has been signed.
>
> This brings home to Americans a fuller realization of the inadequacy of existing legislation. Under emergency war laws such air service as we possess must dissolve six months after the peace treaty is signed.
>
> Shall we go from second place to last?

Air Mail Improvements

WESTWARD the star of empire takes its course—and so does the Air Mail Service. Extension of the service to Omaha and St. Louis this fall is expected to shorten the "business correspondence distance" between the Atlantic and Pacific coasts by sixteen to twenty-four hours.

Otto Praeger, Second Assistant Postmaster General, is energetically developing equipment and pilots to meet future requirements. One of the possible innovations is the delivery and taking aboard of mail bags while the airplane is in flight.

It is not unreasonable to surmise that this idea is a corollary of the feat performed recently by Lieut. Ormer Locklear in transferring from one airplane to another while flying at the rate of sixty miles an hour. Mr. Praeger, however, contemplates the use of specially prepared mechanical apparatus in accomplishing this improvement, using lightly loaded ships for the purpose. Shortly, he announces, the Post Office Department will let bids for large, multi-engined airplanes, and with these an attempt will be made to drop mail on the roofs of buildings—and possibly taking it on from them. Such a plan, if successful, would save thirty minutes in time on the route between New York and Washington, while serving both Baltimore and Philadelphia.

National Advisory Committee For Aeronautics

Functions and Personnel of the Sub-Committees, Known as Standing Committees, Have Been Approved

The following functions and organization of the Subcommittees of the Executive Committee of the National Advisory Committee for Aeronautics have been approved by resolution of the Executive Committee:

The Executive Committee shall have six subcommittees, to be known as standing committees on

(a) Aerodynamics,
(b) Power Plants for Aircraft,
(c) Materials for Aircraft,
(d) Personnel, Buildings, and Equipment,
(e) Publications and Intelligence,
(f) Governmental Relations.

These standing committees may, from time to time appoint special subcommittees with the approval of the Executive Committee.

The functions and membership of the standing committees shall be as follows:

Aerodynamics

Functions—The functions and duties of this committee shall be:

1. To aid in determining the problems relating to the theoretical and experimental study of aerodynamics to be experimentally attacked by governmental and private agencies;

2. To endeavor to coordinate, by counsel and suggestion, the research and experimental work involved in the investigation of such problems;

3. To act as a medium for the interchange or information regarding aerodynamic investigations in progress or proposed;

4. The committee may direct and conduct research and experiment in aerodynamics in such laboratory or laboratories, either in whole or in part, as may be placed under its direction;

5. The committee shall meet from time to time on call of the Chairman, and report its actions and recommendations to the Executive Committee.

Organization:
Chairman, Dr. John F. Hayford.
Vice-Chairman, Dr. Joseph S. Ames.
Professor Charles F. Marvin.
Col. T. H. Bane, U. S. A.
Lieut. Col. V. E. Clark, U. S. A.
Dr. A. F. Zahm.
Lieut. Commander J. C. Hunsaker, U. S. N.
Dr. L. J. Briggs.
M. D. Hersey.
E. P. Warner, Secretary.

Power Plants for Aircraft

Functions.—The functions and duties of this committee shall be:

1. To aid in determining the problems relating to power plants for aircraft to be experimentally attacked by governmental and private agencies;

2. To endeavor to coordinate, by counsel and suggestion, the research and experimental work involved in the investigation of such problems;

3. To act as a medium for the interchange of information regarding aeronautic power plant investigations, in progress or proposed;

4. The committee may direct and conduct research and experiment on aeronautic power plant problems in such laboratory or laboratories, either in whole or in part, as may be placed under its direction;

5. The committee shall meet from time to time on call of the Chairman, and report its actions and recommendations to the Executive Committee.

Organization:
Dr. S. W. Stratton, Chairman.
L. M. Griffith.
Professor George W. Lewis.
Major George E. A. Hallett, U. S. A.
J. G. Vincent.
Harvey N. Davis.
Dr. H. C. Dickinson, Acting Secretary.
One member to be nominated by the Navy Department.

Materials for Aircraft

Functions.—The functions and duties of this committee shall be:

1. To aid in determining the problems relating to materials for aircraft to be experimentally attacked by governmental and private agencies;

LOADING MERCHANDISE IN AN AIRPLANE

This picture shows merchandise ordered by customers of L. S. Plaut & Co., Newark, N. J., being loaded in plane. Standing by the plane are Pilot-in-Chief Stuart Morgan; Chas. Witteman, Prest., Witteman-Lewis Aircraft Corp.; Walter Witteman, Vice-Prest.; Julius M. Meirick, expert commercial aviation, who had full charge; Edward J. Ward, Store Supt., and Harry Hibscher, Display Manager of L. S. Plaut & Co. The destination was Asbury Park. Flying time 25 min.

2. To endeavor to coordinate, by counsel and suggestion, the research and experimental work involved in the investigation of such problems;

3. To act as a medium for the interchange of information regarding investigations of materials for aircraft, in progress or proposed;

4. The committee may direct and conduct research and experiment on materials for aircraft in such laboratory or laboratories, either in whole or in part, as may be placed under its direction;

5. The committee shall meet from time to time on call of the Chairman, and report its actions and recommendations to the Executive Committee.

Organization:
Dr. S. W. Stratton, Chairman.
Dr. G. K. Burgess, Vice-Chairman.
Lieut. Col. H. C. K. Muhlenberg, U. S. A.
Lieut. Commander J. C. Hunsaker, U. S. N.
H. L. Whittemore, Acting Secretary.

Personnel, Buildings and Equipment

Functions.—The functions and duties of this committee shall be:

1. To handle all matters relating to personnel, including the employment, promotion, discharge, and duties of all employees and others assigned to the committee for duty;

2. To consider questions referred to it and initiate projects concerning the erection or alteration of buildings and the equipment of buildings, offices, and houses, etc.;

3. To meet from time to time on call of the Chairman, and report its actions and recommendations to the Executive Committee.

4. To supervise such construction and equipment work as may be authorized by the Executive Committee.

Organization:
Dr. Joseph S. Ames, Chairman.
Dr. S. W. Stratton, Vice Chairman.
Professor Charles F. Marvin.
J. F. Victory, Secretary.

Publications and Intelligence

Functions.—The functions and duties of this committee shall be:

1. The collection, classification, and diffusion of useful knowledge on the subject of aeronautics, including the results of research and experimental work done in all parts of the world;

2. The encouragement of the study of the subject of aeronautics in institutions of learning;

3. Supervision of the Office of Aeronautical Intelligence;

4. Supervision of the foreign office in Paris;

5. The collection and preparation for publication of the annual report and its appendices.

Organization:
Dr. Joseph S. Ames, Chairman.
Professor Charles F. Marvin, Vice-Chairman.
Miss M. M. Muller, Secretary.

Governmental Relations

Functions.—The functions and duties of this committee shall be:

1. Relations of the committee with Executive Departments and other branches of the Government;

2. Governmental relations with civil agencies.

Organization:
Dr. Charles D. Walcott, Chairman.
Dr. S. W. Stratton.
J. F. Victory, Secretary.

If Late—Take a Plane

Mrs. Leon Errol, known on the stage as Stella Chatelaine, is the first trans-Atlantic traveler to have caught her steamship by means of an airplane. She was stopping at Hounslow, fifteen miles from London and eighty miles from Southampton, from where the Aquitania was scheduled to steam for New York June 14. Mrs. Errol missed the train by two minutes. Hounslow is an aviation center, and Mrs. Errol told her troubles to Colonel Henderson, in charge of the aviation field there.

"Toss your bags into this machine," he said, pointing to a fast one. Mrs. Errol did so, and two minutes later was on her way to Southampton, arriving there nearly two hours ahead of the train.

Shall Army and Navy Airships Be Similar?

(*Continued from page* 6)

mostly on the seas should be naval forces. Forces acting mostly on land should be Army forces. There will always be a zone of overlapping activities. Soldiers who want to go to sea and sailors who will see nought but horses and mountains. Now we have the new types, the flier who wants to land on water when he has wheels under aircraft, and the flier who wants to work from land when he has floats under his aircraft.

The airship presents a greater quandry than the airplane does, but its problems will probably be solved as the old Army and Navy problems were—namely, by its greatest amount of use. Perhaps the Army never should have given up the airship; but, since it is returning to its use, it may benefit by those great developments the Navy made in non-rigids during the war. If changes are needed to use them inland, make them. If they are not needed, let the types alone. As for the rigid airship, the British Navy improved it for naval use. Can our Navy go them one better? The German Army misdirected the use of the rigid airship. Can our Army find its legitimate sphere in overland use? Can it find how to fit it out to perform those great overland trips which our continent makes necessary?

Mr. Leopold with Trego

Joseph Leopold, formerly sales manager for the Jones-Motrola, Inc., now occupies the same position with the Trego Motors Corp. Mr. Leopold has had a wide experience in the aeronautical field through his connection with companies supplying airplane engine parts and tachometers.

Proud He Is American

"The flying boat is the thing. The way the Americans crossed the Atlantic is the real way to do it."

Lieut. Arthur Whitten Brown, the American navigator, thus expressed himself in commenting upon recent developments of transoceanic flights.

"Of course," he added, "there will be other stunts like ours, but the flying boat is the thing."

Although England has been claiming the great Atlantic flight as a "British triumph," Lieutenant Brown, whose brilliant navigating made it possible, puts the matter in rather a different light in his interview.

"I am glad I am here, but I hated to leave home," were his first words.

"What do you call home?"

America Brown's Home

"America—the United States—that's home and always will be. True, I am technically a British subject while in the Royal Air Force, but really at heart I am American. Why, I used to live on Herkimer Street, Brooklyn, just off Fulton Street. I have relatives there on Pierrepont Street now. I am proud of my American origin."

The lieutenant had little to add to what has already been said regarding the details of the flight. He said:

"During the morning, when we could not see either ocean or sky and there was no trace of the sun and, apparently, no means of getting the true bearings in the rainstorm, I thought up the idea of using a little pocket level which I carried with me.

"With this little instrument, less than three inches long, I was able roughly to determine our whereabouts. I wish I could have had a Bird sextant, such as Commander Read used, but it did not arrive in time."

Lieutenant Brown gave details such as height, speed and direction, already published, adding an interesting account of what a navigator does when bad weather hampers him.

"I kept my compass to see whether we were on the course," he said, "and listened in on wireless messages, none of which seemed to be for us, watched the speedmeter and fed Alcock. Yes, this was necessary, for Jack never took his hands off the controls during the entire flight. That in itself was a remarkable physical feat under a great strain. He is a remarkable chap and the best pilot I know."

Arise, Sir John Alcock

Capt. Sir John Alcock tells this simple story of what happened to himself and Lieut. Sir A. Whitten Brown at Windsor:

"We were introduced to the Prince of Wales, who shook hands and said how delighted he was to think we had successfully flown across the Atlantic. We then went into one of the drawing rooms and were presented to the King. He shook hands and complimented us.

"Then we both knelt on one knee and the King touched us on each shoulder with his sword and conferred the titles on us.

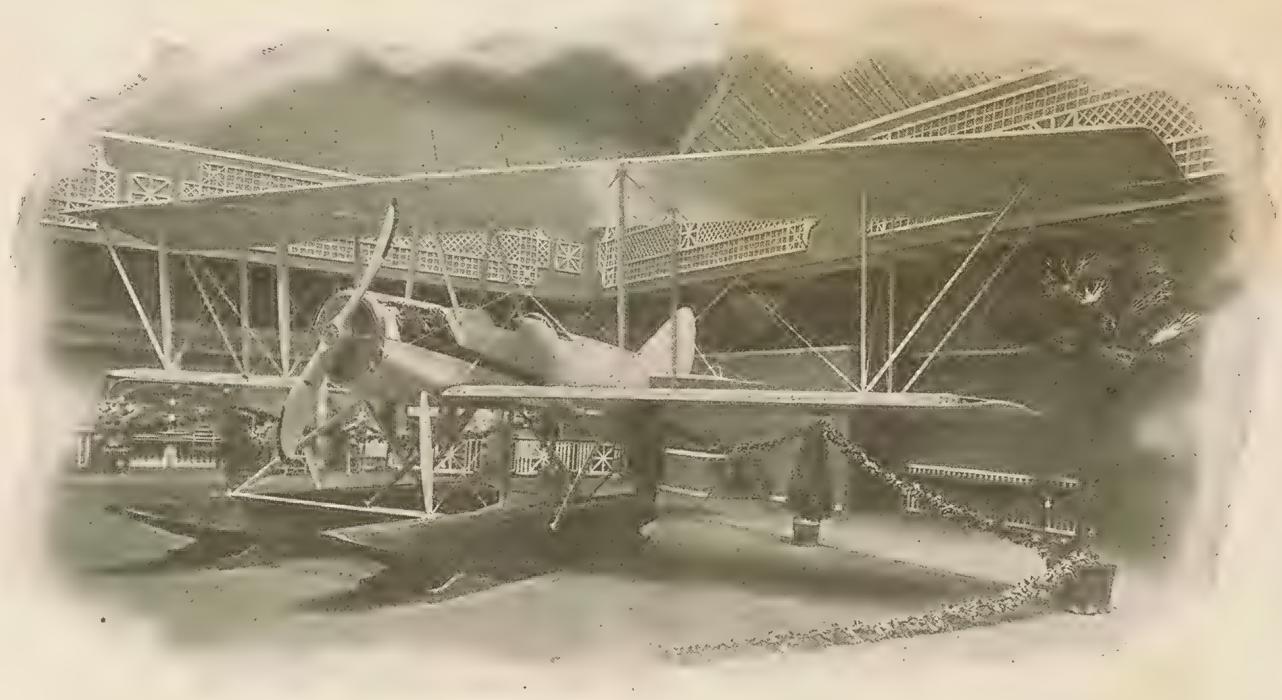
"The Queen then came in and shook hands, after which the King talked with us for ten minutes, asking us many questions about aviation."

Captain Alcock has announced that he and Lieut. Brown, the navigator, intend to divide equally £8,000 ($40,000) of the £10,000 prize given to them by the *Daily Mail*, which was presented on June 20. The remaining £2,000 ($10,000) will go to the workmen who built the machine.

Boulton & Paul Abandon Trip

Plans of the Boulton & Paul Co. to start two fast planes to Ireland have been abandoned, according to a cable message received by Major Fiske, the representative at St. John's of the British firm.

All arrangements also have been cancelled for the projected trans-Atlantic flight by the specially designed and constructed biplane, the Seabird, entered by the Alliance Airplane Company of England.



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National Society of the Daughters of the American Revolution. Charter members' and officers' insignia
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Order of Indian Wars of the United States
Society Veterans of the Indian Wars
Naval and Military Order of the Spanish-American War
Society Army of Santiago de Cuba
Army of Philippines
Society of the Porto Rican Expedition
Military Order of the Dragon
Military Order of the Carabao
The Society of Manila Bay
Military Order of Moro Campaigns
Order of the White Crane
Order of the Founders and Patriots of America
Order of the Descendants of Colonial Governors
Society of Colonial Wars
Order of Runnemede (Magna Charta)
Medal of Honor
The Veteran Corps of Artillery of New York (The Military Society of the War of 1812)
National Society of the Colonial Dames of America
Society of Daughters of the Cincinnati
Order of the Crown
Colonial Society of Pennsylvania
Pennsylvania German Society
Medal Commemorative of the Centennial Anniversary, 7th Regiment, National Guard, State of New York
Centennial and Memorial Association of Valley Forge
Jefferson Davis Monument Association
Military Order of the Midnight Sun
Order of Washington
Order of St. George of the Holy Roman Empire
United States Military Academy
United States Naval Academy
Union Society of the Civil War
Descendants of Signers
National Society of Patriotic Women of America
Navy League of the United States
Military Order of the Serpent
Society of the Ark and the Dove
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Order of Colonial Lords of Manors in America

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Non-Sinkable Suits

Non-sinkable "safety" suits which have become an important part of an aviator's equipment have as the result of repeated experimentation been developed to such a point that they weigh less than fifteen pounds and require hardly a minute to be adjusted. These suits will keep the wearer afloat warm and dry even amidst floating ice chest-high out of water in an upright position.

Non-sinkable suits derive their buoyancy from special jackets inserted in the suit, which are strong enough to support the weight of several persons in water. High gravity rubber composition soles keep the wearer in an upright position at all times. No clamps, frames, draw strings, or other mechanical contrivances are used in the best safety suits.

Safety suits to be satisfactory must allow unlimited freedom of action for every emergency. This is absolutely essential if an aviator is to be permitted to devote all the attention necessary for the piloting of his ship.

The Dreadnaught safety suit supplied by the Safety-at-Sea Corp., New York City, has elastic rubber wristlets and collars that help make the garment watertight. This outfit complete measures approximately 18 x 12 x 7 and makes a small bundle easily carried, 14 pounds in weight. Watertight mittens to protect the hands are furnished separately. Each suit has a large pocket to carry concentrated food or light tools for quick repair work.

Non-sinkable suit and mail bag

One valuable feature of the Dreadnaught suit is the method in which the padded "Kapok" lining is distributed. This is so arranged that it does not have the usual tendency of many other costumes to push the pilot forward in the seat or give him a crowded or bulky feeling. With the "Dreadnaught" the wearer fits snugly and comfortably in his seat with the safety belt adjusted over the suit and around the waist in a neat, snug, safe and comfortable manner; and although every detail for providing freedom to the wearer has been worked out carefully one of the principal features of the garment has by no means been lost sight of or neglected—namely, its imperviousness to both atmosphere and water.

Dreadnaught suits were worn by the pilots of the Vickers-Vimy-Rolls machine in their non-stop flight across the Atlantic, and have been supplied on special order to the Martinsyde and Handley Page crews. Harry G. Hawker said of the suits: "The waves were running twelve feet high and breaking over both of us, but our life saving suits kept us dry."

After exhaustive tests Dreadnaught suits were ordered by the U. S. Navy for the crews of the NC planes on their trans-Atlantic flight.

New Packard Field

First flights are being made these days at the new Packard aviation field, located between Detroit and Mt. Clemens. Lt.-Col. J. G. Vincent, vice-president of Packard engineering, who became during his army service an expert pilot, is doing most of the flying.

A part of the field already is in condition for use. On the remainder of it a wheat crop is growing, and it will not be disturbed till harvest. The company's experimental planes are being removed from Morrow Field, in northwest Detroit, to the new grounds. Before long maps and charts for the guidance of aviators in making the field will be issued.

"It seems as if every flight I have made recently confirms my enthusiasm for aviation," said Colonel Vincent, alighting from one of his rides in the sky. "I was never so much struck with the desirability of air travel as in going to and from Indianapolis at the time of the recent Liberty sweepstakes on the speedway there.

"The return trip was an especial advance over the forms of transportation to which we are most accustomed. I flew from Indianapolis to Detroit via Dayton, a full 300 miles, in two hours and twenty minutes. Most of the time I was riding at an altitude of 10,000 ft., cool and comfortable in an aviator's suit, while down below me the hundred thousand folk who saw the race were making their way homeward in stuffy railroad cars."

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Airplane Influence on Internationalization

(*Continued from page* 4)

on the air charts is from Rome to Catania, Malta, Triploi and Bangazi, where it can hook up with the British system of Egypt. In the north of Italy Pisa in the international scheme of things will become an important air base not only for Italian aviators but for British and French pilots bound for the East and crossing the Mediterranean to Pisa from Antibes in France.

Toward the International

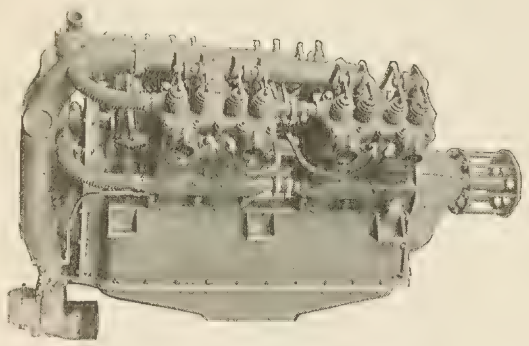
Enough has been said to show that none of the three great powers of Western Europe can be sufficient unto itself in the navigation of the air. The airplane probably will be a greater influence toward internationalization than the covenant of the league of nations. The great need today in the development of aviation is international coöperation and international rules for its control. Customs and passport officials are scratching their heads over new points in international law brought up by the flights of ambitious aviators who disdain national boundary posts and drop in on neighboring countries with the best of intentions but without the proper papers to make their visits conform to the necessary courtesies. For such and more important reasons of international polity, rules for the navigation of the air are being formulated at the Peace Conference. The International Air Commission, which has been given official status at the Conference, has already laid down the guiding principles for the aerial terms of the peace treaty. Sub-committees of the International Aerial Commission are working out the details of the military, legal, commercial and technical aspects of the problems of the air.

International Cooperation

With each nation's sovereignty assured, the Aerial Commission at the peace conference has gone on to the establishment of the principles of international coöperation. It has agreed upon the following principles:

1. Recognition of the greatest possible freedom of aerial navigation as far as that freedom of navigation is reconcilable with the principle of the sovereignty of each state in the air above its territory with the security of the state affected and in conformity with a strict enforcement of safety regulations.
2. Regulation under obligatory permits for pilots and other aeronautical personnel to be mutually recognized by the signatory states.
3. The establishment of international air rules, including signals, lights, methods of avoiding collisions and regulations for landing.
4. The recognition of the special treatment of army, navy and state 'planes when on duty for the state and not applying to state-owned commercial 'planes.
5. Recognition of the right to utilize all public aerodromes in other states, under a charge to be equal to the 'planes of all nations, including the home nation.
6. Recognition of the right of crossing one country to go into another with the privilege of landing, but under the reservation of the right of the state crossed to apply its local rules and if necessary to force the landing of the visiting 'planes on signal.
7. Recognition of the principle of mutual indemnity to cover damages to persons or property due to aircraft, the state of the offending 'plane to make reparation and then to recoup itself in any way it sees fit.
8. Recognition of the necessity of a permanent international aeronautical commission in order to keep the development of the legal side of aviation abreast of the development of the science itself.
9. Recognition of the obligation of each state to regulate its internal legislation along the lines of the clauses of the international agreement.

These principles will be the sign-posts of a great era of internationalization, in which the aeroplane is to play a major part. The hearty spirit of cooperation among the air experts at the present time augurs well for the day when American, British, French and Italian ships of the air will be passing port and starboard, on the great international routes of the air.—*Alfred M. Brace in New York Tribune.*



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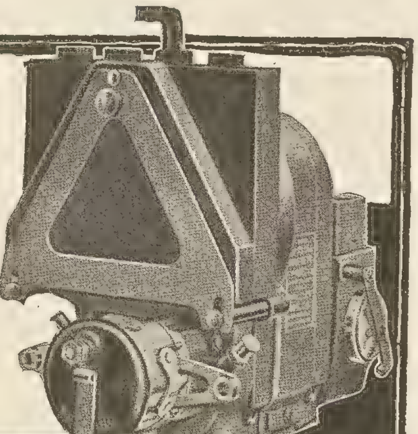

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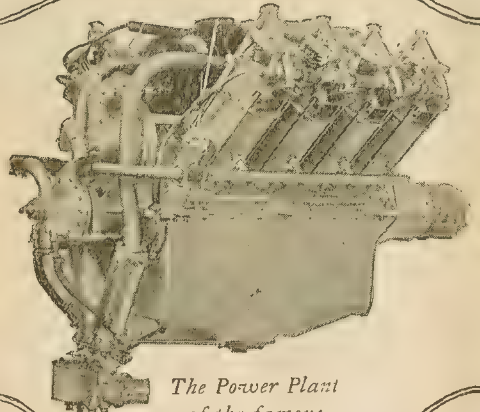

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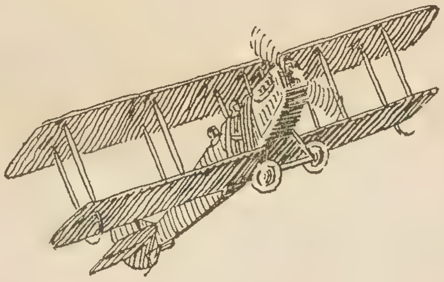

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